SANITATION

PERSONAL AND PUBLIC

J. P. SANDLANDS

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For Mr Bauer

SANITATION—PERSONAL AND PUBLIC

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A BOOK FOR COUNTY, DISTRICT, AND PARISH COUNCILLORS

BY

J. P. SANDLANDS, M.A., T.C.D.

AUTHOR OF

'THE NEW ART OF HEALING,' 'NATURAL FOOD,' 'FALLACIES IN PRESENT DAY THOUGHT,' ETC.

'Mens sana in corpore sano'

LONDON
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.
1902

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PREFACE

THIS book is written for those who are interested in the public health, and in their own. There are those who, because they are at present in health, easily put the matter out of thought and care. An old proverb says, 'The well is never missed till it is dry.' And there is another similar, but more modern saying, 'Health is never valued until we have lost it.' Surely, if people rightly estimated the value of good health while they possessed it, they would do all that lies in their power to prevent their losing it. And they would be glad to learn what they may wisely do.

I have, just now, a case of cancer in hand. People pooh-pooh my attempts at healing it, or rather, causing it to die. They may be mistaken. If this man had known, when he was well, that he was doing those things which tended to produce cancer, he would have taken care. If we do not succeed in putting him right (I do not apprehend this)[1] the poor fellow has an awful amount of suffering before him. If he had known what was before him he would have taken every precaution to avoid it. There are thousands of persons to-day in the same state; thousands who are doing the very things, and even worse things, than he has done. In these pages we propose to show how such possible sufferers may forestall the evil day.

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[1] Since writing the man is well.

This book, however, is more especially intended for those who are, or ought to be, interested in the question of public health. The title-page calls it a 'Book for the County, District, and Parish Councillor.' These councillors, in every part of the land, direct the work of the Sanitarians. By Sanitarians we mean those who, in the work of their various offices, seek to promote health by preventing disease. The councillor has to be guided, not so much by what he himself knows, as by the *experience* of those who possess technical knowledge.

At present very few councillors have any power of testing the value of this technical knowledge. The following pages will enable him to do so. They will supply him with *principles* by which, in almost every instance, he will be able to test the *dicta* of those by whom he has hitherto been blindly guided. He will be able to judge for himself, which is a most desirable thing.

There is, then, a *raison dêtre* for the book. The new theory of the 'microbe.'—I call it *new*, for I have contended with it ever since its inception a few years ago,—has taken a good hold of the scientific world. It must have its day, as most other such theories have had theirs, and then it will die. I do not expect to be present at its burial, but I should be glad to hasten its ending. Light is dawning, and some folk are beginning to see that the 'microbe' has ruled us quite long enough.

The 'microbe' theory, though it has not greatly influenced the practice of medicine, is the supreme occasion of all *sanitary works*. Destroy *him*, and the necessity for *them* will largely cease. A true picture of the present state of things is, or would be, Hercules smiting a gnat with his club. The arguments that I have amassed are like the club of Hercules. The gnat is a representative of the microbe, only that it is too big. But where is Hercules? I hope he will find his embodiment in the great number of those who read, and make their own, the principles set forth in the following pages. The 'microbe' would soon be slain, in spite of its defenders. These are at present legion, and they hedge the little creature in on every side. But for this the difficulty of killing him would not be great. The main point is to *get at him*.

One of the ancients' mottoes has nerved my arm many and many a time—*Labor omnia vincit.* I have proved the truth of the saying more than once. I have laboured, and shall continue to do so, in order to scotch and kill this scientific creation, this mysterious ‘microbe.’

The other day, a lady wrote to me respecting my theories as given in my book ‘Natural Food.’ She asked this question, ‘Is civilisation a mistake?’ Civilisation may or may not *be* a mistake. Civilisation *makes* many mistakes. And yet, it is more true to say, many mistakes are made in the name of civilisation. This, however, need not trouble us. Our business is not with what civilisation is, says, or does: our business is with *Nature.* What does she say? What does she do?

Civilisation may have originated the ‘microbe theory,’ for aught I know. Civilisation is the grandest thing on earth. It makes no mistakes. But many wrong things are done in its name which it does not inspire. Civilisation may have invented the microbe in order to meet a felt want. Something was necessary in order to cover the faults of its working. Civilisation may be answerable for the many diseases that obtain among us. Then it must need excuse itself. How could it do so better than by inventing the microbe? It is not an evil spirit, or a wizard, or a witch that hath wrought these evils;

it must be this 'microbe' that is the mischief-maker.

I have thus explained my object in writing this book. I hope it is a legitimate one. I have notified in particular those for whose sake chiefly I have written these pages. I hope they will accept it in the same spirit as that in which I write.

What I have written will also be of great interest to the *general public*. I am not ambitious enough to imagine that all the contents of this book will be either appreciated or accepted. The forces against the principles which I expound are too many and too powerful. All reforms, to be genuine, must come from within, and there must be a general consensus of opinion before they can be adopted. The reformer is the man who, for the moment, is best able to focus the feeling and thought which prevail. But if one here and one there, who *wants light*, should find it here, I shall be sufficiently rewarded. With at least this measure of hope, I send forth the book. May it prove a blessing to many, and a cure to not a few!

BRIGSTOCK, THRAPSTONE.
October, 1902.

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CHAPTER I

INTRODUCTION

'*Ne sutor ultra crepidam.*' So spoke Apelles, the painter, to the cobbler that would criticise his picture. We anglicise the expression, and it has now passed into the proverb, 'Stick to your last'; or, in a more abrupt form, 'Mind your own business.' The advice is often good, but not always. I once knew a man who, when greeted with the usual salutation, 'Good morning, Mr. G., where are you going?' would answer, 'I am going where you ought to be going, and everybody else too.' 'Oh, indeed! Where is that? It is not Sunday, and we shouldn't be going to church.' Mr. G. would leave his friend for a moment to meditate and get out of puzzledom, and then he would say, 'I am going about my business.' I once saw a notice in an office which ran something like this: 'Come on business. Attend to your business. Do your business. Go about your business.' This is all very suggestive. There is also another saying to this effect, 'What is everybody's business is nobody's business.' Evidently we can play on this word 'business' to our 'heart's content.'

I have lately had a good deal of conversation with a friend, whose great notion is that we should let everybody alone to 'gang their own gait,' as Sir Walter Scott would say. It is not wise to stumble up against every man you meet. And 'What is the good? You cannot *alter* anything.' My friend's is certainly the way to jog along easily through the world. But it is not *my* way. I have all through my life felt that I had a sort of royal commission to try and set everything right that is wrong. It is a big and, perhaps, a hopeless task; but still I stick to it, and shall to the end.

I do not quite see the wisdom of being indifferent to things about you. 'Mind your own business.' 'Stick to your own business.' But surely it is somebody's business to see that other people *do* mind their own business. It is precisely at this point that I come in. I make it my business to get people to do their work properly. I show them how. At least I try to do so.

I was in my bedroom the other night and beginning to undress, when there came a knock at the door. I answered, 'Come in.' It was a man who wanted me to come at once to his house. He was in a very excited state, and from what he told me I saw there was no time to lose. I hurried away with him. He told his tale more fully as we went along. There was something seriously wrong with his nephew. We soon arrived at his house, and I took the whole circumstances of the case in at once. The mother was almost fainting, and there was consternation reigning everywhere. I said, 'Get some hot water at once,' and then rushed upstairs. I entered the room, and saw the father with his boy—a lad about thirteen—in his lap. My both hands were upon him like lightning, and I held them where I placed them. There was no time to lose, for the lad was dying. Presently I saw the colour returning, and I heard a rattling in the throat. The lad had been choking, and was almost gone. I left him still unconscious, but yet recovering. The doctor, who had meantime been sent for, took two hours to come. Delay meant Death. And yet it was *not my business!* It was fortunate for the boy and the parents that I made it my business.

A few weeks ago I undertook a very serious case. It was one of epilepsy. Some time ago the gardener at the Manor House, who for years had been a member of our choir, left for Idlicote. He had an only child—a lad about eleven years old. Of course the lad was very precious to them, and he was a good boy, and withal intelligent. At the beginning of June he became ill. The doctor came, and attended him till beyond the middle of July. The lad got no better, and the parents were beginning to find that the strain on their earnings was rather more than they could afford. They determined to try a change. The mother brought the lad to Brigstock. It was thought the air of the place where he had been so long might have a beneficial effect upon him. He did not improve much, and at last she brought the lad to me. I advised her to leave him with some friend for a fortnight, and I would put him to rights. She took my advice. The lad returned home well, and has not suffered since. And yet it was *not my business!* The epilepsy might have killed him.

It is also sometimes said to me that I 'don't know.' In answer to this I may say, That is quite true. But then, unfortunately, we are all pretty much in the same condition. What do we know? Who, even the best of us, is there that can say, 'I know.' We ask, '*Quis scit?*' and no one can answer, '*Ego.*' The '*ego*' is an ignoramus. He cannot say, '*Scio.*' 'We know in part.' Further than this we may not go. I think, however, the friend who charges me with ignorance should first make it clear that *he* speaks from accurate knowledge. I have had people come to me from Australia, New Zealand, North and South America, and other distant places, to be put right. These things ought to imply the right and privilege of at least expressing an opinion. 'The proof of the pudding is in the eating.'

To return to our illustration of the cobbler. He knows his business, and should be allowed his opinion in relation to it. Very well. We admit this. But should *his* opinion exclude *ours?* He knows what a boot is; of what it ought to consist, and how it should be made. We need not discuss any one of these points with him. The matter, however, does not end here. It still remains for me to say exactly the material, the shape, the size, and how to make it. He knows, in short, what he can do; and I know what I want. I like his work, and am quite willing to employ him. But he must make the boot to please me.

It is altogether another matter whether I really need his work or not. It may be, indeed, that I do not need it. Far from this, I may be altogether better without it. The Zulus do not wear shoes, and do not want them. They are altogether better without them. It may be so, and very probably is so with me. That, however, is not a question for me to settle. In this I am not my own master. 'One is my master,' but that is not Christ, it is Fashion. This is imperious, and I cannot get away from its demands. I must wear some covering on my feet. I can only so far rule the cobbler. I may say to him *what* I will have.

All this illustrates exactly how we stand in regard to sanitation. We are not going to discuss the *manner* of the sanitarian's work. We have nothing to say about the material with which it is done. It may, or may not, be of the very best workmanship. And it may be the best possible to accomplish its ends. On all this we have nothing to say. We allow the principle covered by the expression, '*Ne sutor ultra crepidam*,' to have its full sway here. It does not concern us. Our object will be to examine the *objects* and *aims* of the sanitarian, and to see whether he does actually accomplish them. The cobbler accomplishes his aims, and so far satisfies us. Does the sanitarian do as much? We see now exactly where we are. The field of exploration that we have to cover is a large one. We may not accomplish our object. Our ambition stretches, it may be, far beyond our powers, and we shall make but a poor show. That, however, remains to be seen.

There is something further to be said, but it is not easy to say it. There is a large army of opponents with whom we shall have to reckon, and there is a vast amount of prejudice which we shall have to get out of the way. There is first the Local Government Board. This is a powerful piece of machinery that operates, more or less, in every town, village, and hamlet in the kingdom. There are the many officers who depend upon its operations for their daily bread. To stop its work means to stop their bread-and-butter.

The self-interest of a great number of state officials is practically against any reform. They are committed to the same line of action. They have, so to speak, been brought up on this line, and they have drunk in its principles with their food. It is no easy matter to describe what all this means.

Then there is the 'County Council.' Its functions are multifarious, and are not confined to strictly 'sanitarian' work; but still it has also very much to say on this matter. It is not an easy thing to influence its workings.

There are two other councils, the 'District' Council and the Parish Council. How many are the officials, officers, lawyers, clerks, and what not who are dependent on all this machinery! We need not even stop with them: there are the actual members of these councils. Their offices are for the most part *honorary*. It seems that these honorary members receive no pay, and yet they are most anxious to be in office. How is this? We had a Manchester cotton-spinner staying with us some time ago, and he regaled us with stories of the doings of these councillors. His stories detailed a good deal of jobbery, and this explained, to some extent at least, the anxiety to be on these councils. I was forcibly reminded of much that I learnt when I was in Washington about the Senators and Congress-men. They enter their positions *poor* men and come out of them rich men. How is this? Let those explain who know.

But here we are with four councils. The business of these councils is very largely, though not exclusively (unless we exempt the 'Local Government Board') concerned with 'sanitation.' Their *raison* *d'être* is indeed little else. And further, they are committed to carrying out 'sanitation' on the lines that are at present laid down. The members of these councils may be, and often are, men of business, who probably know their own work well, but they do *not* know, and *cannot* know, anything about sanitation. They are guided by their medical officer, who often says what he may consider to be the best thing in the circumstances, not what he knows is absolutely best.

By way of illustration we may notice what has just taken place in our own village. There were two children ill. The local doctor came and saw the cases. He pronounced them both to be cases of 'diphtheria.' They were *not* diphtheria. I visited one of the cases three or four times a day for several days before the child died. She had something wrong in her throat, but that was not the cause of death. Now I had never, so far as I know, seen a case of diphtheria before. It is said, however, that it is a throat disease. In this case the child did not die of diphtheria because the disease of the throat could not have produced death. There was further evidence, too (which I need not describe), both in what I saw and in what the mother told me, that the trouble was *internal.* So much for the one case. The mothers in both cases were so worried and distressed that I had to take them both in hand and so far bring them about again. This gave me ample opportunities for discovering that the cause of death was the same in both cases. I was further assured, from the inquiries I made and from the facts I witnessed, that the primary cause of death in both children was *mal-nutrition.* I felt sure, too, from the way in which they had been fed, that white bread had to answer for the mischief.

There was a great commotion. Tents were erected as hospitals. They were inconvenient, and could not be used. A hospital was then extemporised. Nurses were procured. The medical officer came to report. The council sat and debated. The papers were filled with the accounts of the serious outbreak of diphtheria in the village. The people were scared. A hundred of them went away. People from a distance would not come near us. The 'Horse Show' was held at Boughton Park. The 'Sale of Work' was deferred till the autumn. Mothers were driven half wild. It was vain to appeal to common sense. The doctors had spoken, and they were the supreme authority. I gave a lecture to counteract the fuss. It had some effect on the audience, but it went but little further.

A fact of some interest occurred in connection with this lecture. We had a number of persons staying in the house at the time, and I made the most of them as *pro tem.* reporters. In this way we were able to get seven or eight very fair reports of the lecture. We sent these reports to the several papers, but only in one or two cases could we get anything like a fair account given. In one case the Editor made me talk the veriest nonsense. In another case the lecture was so badly reported that it gave occasion for the *General Practitioner* to comment as follows:

'We are indebted to a Yorkshire member for the report of a lecture on "Diphtheria, its Causes and Cure," which was published in the *Oundle and*

Thrapston Guardian (Northants) last week. The lecture was delivered by the Rev. J. P. Sandlands, the Vicar of Brigstock, to his parishioners. He commenced by telling the natives that it had often been remarked to him "that the matter of dealing with disease was not his business," *an opinion which shows that there are some persons who use their brains aright even in Northamptonshire*, and we have no doubt our readers will agree with the Vicar's candid friends when they read the following excerpts from his dissertation.

'Dealing first with the pathology of diphtheria, the reverend lecturer said the disease really signified "a double skin," and the person who suffered from it really got a second skin in the throat covering the natural one! This pathological pronouncement is *very lovely even for a parson.*

'We believe that many of the medical men residing in the Oundle district are members of our Association. If they have any influence with the Vicar we hope they will use it and get him to stick to theology. *Such a man can only do harm if he drops theology for medicine. Let him stick to his last.*'

I am perfectly willing to acknowledge that the report was not accurate. It made me speak as if I did not know what I was saying. I should say, however, that this was owing very largely to the fact that the editor attempted a paraphrase. Some kind friend sent me the number, with passages underlined, for me to con. I did not take it amiss. I felt more amused than hurt. I thought, however, that in justice to myself and the public I ought to have the right of reply. I wrote a very polite note to the Editor, asking for the favour. I waited several days for an answer, and, when none was forthcoming, I wrote to one of the county papers, taking care that the Editor should get a copy. The following is the letter:

'SIR,

'Will you kindly allow me to make public my answer to the strictures of the *General Practitioner* on my lecture. These strictures are somewhat severe. I have asked the Editor for the privilege of reply, but cannot obtain it. My apology for asking you is the importance of the subject. There is such a thing, too, as fair play, and this should count for something.

'I will first re-state the points of the lecture. (1) "You don't know." (2) "It is not your business." (3) What is disease? (4) Meaning of names. (5) What is diphtheria? (6) Supposed causes. (7) Probable real cause. (8) What are the supposed cures? (9) What is the probable real cure? The lecture took more than an hour to deliver, and I spoke somewhat fast. It should have occupied about three columns, and it scarcely occupied half one in the paper whence the *General Practitioner* extracted. The imperfect report may, therefore, explain something; but it does not condone all. The Editor gives an opinion principally of (1), (2), and (5). We will deal only with (5): What is diphtheria?

'He says, "Dealing first with the pathology of diphtheria, the reverend lecturer said the disease really signified a 'double skin,' and the person who suffered from it got a second skin in the throat covering the natural one! This pathological pronouncement is very lovely, even for a parson." This, as Harpogon would say, "ought to be written in letters of gold on our kitchen mantel-pieces."

'May I first ask what the Editor means by the expression pathology of diphtheria? I will translate it for his aid—"Disease discourse of double skin"! I think this beats the reporter's account of my words.

Then may I say I dealt first with the meaning of the names of diseases, and showed how ridiculous these names were? I took diphtheria as an illustration. It means "double skin." We may have a double skin anywhere. What idea does the name convey? I gave many illustrations of this very thing. What will the Editor say now?

'I said distinctly that I did not know what diphtheria was. I had never seen a case before. I said further, and I am prepared to say it again and again, that the child who died, as it was alleged, of diphtheria, died of no throat disease. I challenge him to prove that she did. There was manifestation of trouble in the throat, but there was nothing there to cause death. This is a very common occurrence. How many of our throat troubles come directly from the stomach! How many, again, from the liver! The cause of death was an internal one. These were my points. I made them as clear as the English language would allow me. I do not talk Latin when I speak to an English audience. All my other points were made equally clear and were equally convincing. I do not follow the Editor further, and refuse to notice his aspersions. We do not advance truth by throwing mud. Will you allow me, Mr. Editor, the further indulgence of setting forth these propositions for the consideration of the *General Practitioner:* (1) Disease is one. (2) The cause is one. (3) The cure, where possible, is also mainly one.

'Yours very truly,
'J. P. SANDLANDS.'

The Editor of the *Practitioner* took no notice, so far as I know, of my letter to the paper. The difficulty of getting the authorities to enunciate their *dicta* in adverse circumstances is enormous. If they have anything to say, why do they not speak?

Their silence is only intelligible on the supposition that they have nothing to say. Possibly the *General Practitioner* did not expect that I should see what it had said of my lecture. I do not take that paper in. How indiscreet of the person who sent it to me! He thought, no doubt, to shut me up by the oracle's denunciation; but it had the opposite effect. It gave me further opportunity of speaking.

But to return to our diphtheria pother. The death of these two children was the sign and signal for further proceedings. The medical officer had set the machinery to work and something must be done to keep it going. Whence was it forthcoming? There were other children ill. I saw one of them. He was so ill that he might have been running about the streets! I saw another. This was a little lad, brother of the girl who had died. His primary trouble was liver, secondary nerves. There was nothing wrong with the throat. They managed to get five in all. The little lad was torn forcibly away, screaming and crying, from his frantic mother. What right had they to do this? I saw it stated a day or two afterwards, at one of the Medical Conferences, that they had no legal right. The mother, as I said, was ill, and is so still in consequence. I cannot hear that much was wrong with these five children. I saw two of them after they came out, and they then looked anything but well, and bore all the evidence of improper feeding. The nurses were giving the ones that died raw eggs beaten up in milk—the very worst thing that could possibly be given to invalids, much less to children.

These children were kept about a month, and were then returned to their parents. Nothing further could be done for them. And of course the authorities were careful to have it said 'that diphtheria was stamped out of the village.' There was an 'outbreak'—I do not like the word at all, and think it very stupid—of diphtheria some nine years ago. Then there were forty-five deaths. It is impossible to explain how it came about that there should be so many cases of the same kind of trouble at one and the same time. And yet, on consideration, there is an easy explanation. There were the same causes at work, hence the same result. This time, however, the cases were altogether different.

It would be impossible to describe all that this meant to the poor parents. They were turned out of their houses and were crowded into the houses of their friends. The furniture was all removed, the paper stripped off the walls, the walls colour- or white-washed, the houses disinfected, and they were kept out of them six or seven weeks. They were worried beyond description.

Our schools were closed for the harvest holidays. When we were to re-open, after the holidays, an order came from the medical officer to keep closed for another week, and meantime, colour-wash and white-wash. The sanitary inspector came to talk to me about it. I said to him, plainly and distinctly, that we would do nothing. I said further, We are enlarging the class-rooms, and when this is done, we shall overhaul everything. He asked me if he should come and disinfect? I said, 'If you like to come and do a piece of foolery, you may; but don't ask me to approve.' He then begged me, for the sake of peace, to have it done. On this principle, I assented, I must not omit to mention, that part of his business was to order the schoolmaster to remove a few fowls from an outhouse in the schoolyard. I told him this was ridiculous. He thought it was too. He said he must obey orders—and these were to see that the fowls were removed. The medical officer, it appears, had said 'he had known diphtheria to be communicated by a hen.' Can the ridiculous further go than this?

And now, after all this, one of the members of the district council told me the report of the medical officer was, that the cases were *mild indeed*, and that one of the children had *not died of diphtheria at all.* My contention was that neither had died from any throat disease! And yet we had had all this expense and worry. The hospital and other expenses must have exceeded £100. Besides all this there was the annoyance and loss to the tradespeople and others.

And there was no redress! I wrote to the papers, and did all I could to counteract it all, but in vain. I had a correspondence with the Home Secretary and with the Local Government Board. But the machinery is not made to move backwards, and I could not scotch the wheels. The following letter—and there were others—will illustrate what I was doing.

With reference to this question, the Rev. J. P. Sandlands, Vicar of Brigstock, is in communication with the Local Government Board, and the following letters and telegrams have changed hands:

'LOCAL GOVERNMENT BOARD,
'WHITEHALL, S.W.
'*September* 3, 1902.

'SIR,
'I am directed by the Local Government

Board to advert to your letter of the 25th ultimo, and to state that the Board are awaiting a report from the Medical Officer of Health to the Thrapston Rural District Council on the occurrence of diphtheria to which you refer.

'I am, Sir,
'Your obedient servant,
'NOEL T. KERSHAW,
'Assistant Secretary.'

[Telegram.]

'Morris, School, Brigstock, Thrapston.—Do not open school this week. Writing—ELLIOTT.'

'OUNDLE,
'NORTHAMPTONSHIRE,
'*September* 7, 1902.

'TO MR. MORRIS, THE SCHOOL, BRIGSTOCK.

'DEAR SIR,

'I think it very important that your schools should be colour-washed and cleaned before re-opening. Closets should be lime-washed. It would be very sad if there should be any more diphtheria at Brigstock. I will advise my Council that the schools be closed for another week.

'I remain,
'Yours truly,
'C. N. ELLIOTT.'

'THRAPSTON RURAL DISTRICT COUNCIL,
'THRAPSTON,
'*September* 8, 1902.

'DEAR SIR,

'On the advice of their Medical Officer of Health, and in consideration of the recent outbreak of diphtheria, this Council authorise the closing of the Schools at Brigstock for a period of one week from this date.

'Yours truly,
'GERALD HUNNYBUN.

'The Manager, The Schools, Brigstock.'

'Sir,

'I have to thank you for your letter of the 3rd inst., saying that you were waiting the Medical Officer's report. May I say that the matter is somewhat urgent? Besides the facts that about a hundred people have been scared out of the village, some kept away, and other inconveniences occasioned, implying loss to the tradespeople and annoyance to many, there are the further facts covered by the enclosed telegram and letter. May I call attention to them? In my humble opinion, we who live in the place and know our wants and difficulties, are better able to look after them than strangers. We are wondering why we cannot be left alone. There is nothing wrong with us at all now, and has not been for some weeks. The Medical Officer now admits there is doubt about the cases. I know the two deaths were not caused by any throat disease. I am sure, too, that one of the five children that were put in the extemporised hospital had nothing wrong with his throat. With many apologies,

'I am, Sir,
'Your obedient servant,
'J. P. Sandlands.'

This episode is rather a long one; but it serves well the purpose that I have in hand. I want to show how thoroughly we are in the hands of the authorities; how little we can do to help ourselves; and how obtuse they are. Perhaps 'obtuse' is a strong word. I shall be very glad to substitute another the moment they show a disposition to listen to reason. This is only a specimen of what is daily occurring. Try how you will, you can never move the official mind, or alter the official manners.

We have further difficulties of another kind. The authorities are many and powerful; and there are four different sorts of public to deal with: (1) Those who sympathise with the authorities; (2) those who think they are right; (3) those who feel it is hopeless to try and alter things; (4) those who are indifferent.

1. Those who sympathise with existing things are legion. They think the officials, because they have given time, labour, and thought to their work, must be right. They do not think further than this; they leave discussion to others. They say, if *they* do not know, they ought to know. They are content to leave things as they are.

2. There are many who think they are right. These think on the same lines as the authorities, and they constitute a mighty army, for they are mostly educated men. The following letter will explain:

'DEAR MR. S.,

'*Re* the lecture you sent me. I am glad I knew the J. P. Sandlands, the voice-producer and trainer, before I read the lecture on "The Causes and Cure of Diphtheria," for I doubt I dare have risked my life and placed myself in the deadly peril that I should have pictured for an inmate of Brigstock Vicarage and a pupil of the Vicar. I will swear by the one, and I will do my best not to let a soul know anything about the other man. I don't like the lecture at all, as a serious attempt, and at a serious moment of epidemic, but it would have been delightfully amusing to me at another time. I wonder what sort of audience you had, for the effect of it on them depends on their abilities to discern between strong statements and proofs. It would not do any harm to such as desired proof for assertions that contradicted the principles that have the sanction of the highest authorities; indeed, indirectly good might result, for your reference to the superstition of sanitary experts on drains would remind them to put in order their own drains, and see that the water supply was pure, when they found that you had omitted proof for your assertions, or at least what is of the nature of the proof most of us expect. . . . If you have caused a single person to be careless about drains and water, and to trust to brown bread for protection, I should certainly feel that, in case of another epidemic, that a lecturer would be justified in ascribing it in a great measure to the influence of a lecture on the subject by the Vicar of Brigstock.

'Yours sincerely,
'J. R. N.'

This letter is a specimen of what we get, and illustrates how little people think. I pinned the writer down to the question, How do smells cause disease? But he could not answer me.

3. There are many who feel it hopeless to do anything. They say, 'Let things alone. What can we do? Every man is responsible for his own conduct. It is not our business.'

4. There is no hope, of course, from the indifferent. They take no interest in anything that does not immediately concern themselves.

How can one make an impression? I am not altogether alone. There are some who think with me, though they are but few. We must work on and hope that our labours will eventually bear fruit. It has always been a motto with me, '*Labor omnia vincit.*' And we are obliged to add, '*Hoc opus, hic labor est.*' We shall never succeed if we think that our task is an easy one. It is a question of converting the world; but 'we shall reap if we faint not. There is no credit in doing what others can easily do. The bigger the work, the bigger the credit. Our difficulties are mountains high—prejudices, interests, antipathies, ignorance, and indifference—all as intense as time, custom, and fashion can make them. We must to the work with a good heart, and remember '*Omne verum utile dictu.*'

CHAPTER II

MEDICAL SCIENCE FIRST

THERE is nothing perfect under the sun. This dictum has passed into a proverb, and is generally thought incontrovertible. Scripture tells us, 'God made man upright, but he hath sought out many inventions.' We have put our own interpretation on these words, and have made them mean, 'God made man so that he *could* do perfect work; but he has perverted his ways, and now does nothing well.' However this may be, it is the fact that man does nothing perfect now. He comes sometimes near to perfection; but he is always far enough away. When he sanitates, does he then produce anything that approaches perfection? Our answer depends on our point of view. To sanitate ought to mean to make health easy, and unhealth (or disease) difficult. Does the sanitarian's work touch health at all? This is the question that we are about to examine.

There is a prior question—What is the science of medicine? The science and art of *sanitation* are said to depend on the science and practice of *medicine*. Is this so? It is more than probable that the sanitarian likes to think he is independent of the doctor. He cannot be. He depends on the doctor, and must accept *his dicta.* The doctor is the *fons et origo* of all his work. The *raison d'être* of the one is the *raison d'être* of the other. Hence the science of medicine is antecedent to the science of sanitation.

Is medicine a perfect science? I heard a lecture from an Edinburgh doctor some three or four years ago, and he started with the proposition, 'Medicine is a perfect science; given, therefore, the dicta, we easily arrive at the conclusions.' Such a proposition astounded me. I could think but little of the man who would lay it down. I met with a doctor shortly afterwards, and I told him about the lecture. He said at once, without any reflection or hesitation, 'Medicine is *no science.*' This is exactly what I thought—*medicine is no science.* This doctor had been in practice in Australia.

Some little time afterwards, I read an article in the *Scotsman.* The article was written at the end of the year, if not the end of the century, and was a review of the progress which medical science had been making. The upshot of the article was, that the science of medicine at the end of the nineteenth century was exactly where it was at the end of the eighteenth. The writer also gave it as his opinion that, perhaps, five hundred years hence we might know something about it. This statement and this opinion depend for their authority on the *Scotsman*—and it is pretty well informed on most points.

I came in frequent contact with the medical man who, as doctor, was head and chief of the sanitary authorities for the city of Glasgow. He was considered, and I dare say very properly, a very great authority. He was a very important man. I should say also, from what I gathered in conversation, that he was a very conscientious and religious man. He did not hold with mis-spending the Sabbath, though he did himself some correspondence on that day. In this case of Glasgow, as everywhere, the doctor anticipates the sanitarian.

Not long ago, we had a gentleman staying with us from Kendal. He was, though formerly a clergyman of the Church of England, at that time a Plymouth Brother. He is indeed eminent in that sect, and has written an important work on their order—a history which is regarded as of standard authority. This gentleman told me that his father, who was a doctor practising in Hampstead, had given up the practice of medicine, and had taken to preaching. His brother, too, who was an allopath, had adopted the homœopathic method. He had tried the allopathic system and found it wanting, and so he was now trying the other. The former of these systems regards it as a foregone conclusion that a disease is cured by its *opposite*. This is, indeed, its fundamental principle. The latter holds that a disease is cured by its *like—similia similibus curantur*. The principles are as opposite as the poles are asunder, and both cannot be right. The Romanist teaches that salvation is by *works*. The English Churchman teaches, if he follow the Thirty-nine Articles, that salvation is by *faith*. Here are opposite principles too. Which is right? It is generally said there is an element of truth in both. Is it so with the two great systems of healing? Who shall say?

A doctor's daughter was once taking lunch with us, and she said, 'Father never gives us medicine.' And a young lady, a chemist's daughter, once said to me, 'We don't *take* drugs; we *sell* them.' This experience, however, is not general. The doctor's daughter was well enough, and looked as if she never suffered anything. The chemist's daughter was full of troubles, but did not seem to think there was any relief to be had from medicines.

But though it would be possible to obtain any amount of evidence against the use of medicine, and, perhaps, some for its use, what say the doctors themselves? Can we gather from their writings that their aims and objects are definite? The following is taken from the *Standard* of August 23, 1902:—

'The annual Congress of the Royal Institute of Public Health was yesterday resumed at Exeter, when several sections met. In that devoted to Preventive Medicine and Vital Statistics, Sir Charles Cameron, Medical Officer of Health for Dublin presiding, the question of teaching the principles of public health in rural districts was under consideration.

'Captain J. Phillips, of Frimley, Surrey, contributed a paper in which he described his experiences on a tour through rural villages in Devonshire, and said that many country people there and elsewhere were quite indifferent to the sanitary state of their dwellings and surroundings. He suggested methods of dealing with sewage. It was absolutely necessary for the purpose of eradicating insanitary evils from villages that the people should be practically taught the elements of sanitation. In the interests of humanity, he asked the Health Institute to draw the attention of the Local Government Board to the state of things he had described, and he urged the appointment by the Local Government Board of sanitary inspectors of a higher order than our local inspectors, whose duty it should be to make thorough inspections of all the sanitary appliances in every cottage throughout the rural districts. They should also teach the people practical sanitation as it should apply to cottage houses.

'In the course of a discussion which followed, Mr. Tolson (Exeter) urged that the teaching of the ordinary laws of sanitation should be made a part of the curriculum of all village schools. He also suggested the creation of a Minister of Public Health. Dr. Hope (Liverpool) remarked that in sanitary matters rural districts were lamentably behind the towns, but some of the conditions described in the paper read were a revelation to him. Mr. A. L. Ward (Exeter) spoke of the desirability of trying to impress the rising generation with the importance of sanitary laws. Mr. Gibbon (Wolverhampton) remarked that we talked a good deal of bringing the people back to the land, but how could they, he asked, be expected to return to insanitary places in the country after they had experienced the conveniences of towns? Dr. M'Manus (Clapham) said the Local Government Board was overladen with work, and a Public Health Department should be established. Professor Smith, President of the Institute, said notwithstanding the pictures we saw of pretty dairymaids and picturesque homesteads in the country, farms were really made up of dirty cowsheds (laughter). The people who attended to them were dirty. Their clothes were dirty, and the whole condition of things was disgusting. Rural hygiene required to be placed on a more efficient footing, and he suggested the extension to the country of the system of sanitary inspection prevailing in town. Dr. R. N. Banks (Lanark) said that their description of farms did not apply to Scotland (laughter). Professor Smith proposed a resolution asking the Council of the Institute to call the attention of the Government to this question. The Chairman expressed concurrence with the views of Captain Phillips as to the condition of rural hygiene. Sir H. Littlejohn

(Edinburgh) seconded the resolution of Professor Smith, which was adopted.

'Dr. S. G. Moore (Huddersfield) read a paper on the advantage of teaching hygiene in schools, and other papers on the subject were also contributed by Mr. C. W. Bracken (Plymouth) and Mr. Thomas Burnell (Criccieth). A discussion was opened by Mrs. Windley, who contended that a beginning should be made by teaching the women of the nation, and advocated the formation of a Ladies' Association in connection with the Institute, to give lectures to working women in the subject of hygiene. Mr. H. W. Sandford (Gosport) remarked that the elements of hygiene were taught in the majority of the elementary schools of the country. The Rev. W. W. Young (Wallingford) objected to mere catechisms, for one of the greatest obstacles of education, he said, was teaching children to learn things by heart. The Chairman was convinced of the importance of reaching children through the mothers. On the motion of Dr. Moore, seconded by Mr. Bracken, a resolution was adopted favourable to the teaching of the rudimentary facts of hygiene in public elementary schools, and it was decided that the resolution be referred to the Council of the Institute, with a view to it being forwarded to the Board of Education.'

The 'Royal Institute of Public Health' may be assumed to give us the 'cream of thought' on the question. I do not know of whom it is constituted; but it may be assumed to have in its constituency some of the most eminent men in the profession. It is evident that medical and sanitary science go hand in hand. We leave sanitation for the moment, and deal only with that aspect which concerns health.

Captain Phillips is the first speaker. He has nothing to say about health. His remarks seem to have been confined to sanitation. If, as the Captain evidently imagines, dirt could produce disease, no horse, cow, pig, or sheep could be healthy. They live often steeped, so to speak, in filth. As a question of comfort, by all means be clean; but don't make dirt do more than it can.

Mr. Tolson urges that the teaching of the ordinary laws of sanitation should be made a part of the curriculum of every village school. Now, are there any laws of sanitation? Where are they? Who is their author? What are they? We ask these questions in vain, for no answer comes. Why then do men, with claims to commonsense and education, talk in this way? This good man further suggested the advisability of having a 'Minister of Public Health.' We ask, What on earth he is to do? We have officers too many already. We can scarcely move out of our houses without stumbling against them or their regulations.

Dr. Hope thought the statements of the previous speaker were a revelation to him. I suppose this remark would apply to most speeches. He did not tell the meeting in what particulars the rural districts were behind the towns Are they behind the towns? Then how is it country people live longer and look better?

Mr. A. L. Ward would have the rising generation taught sanitary laws. By whom? We must first find out these laws. How can we teach what we do not know?

Mr. Gibbon asked how people could be brought back from the sanitary towns to the insanitary country. This is a very bright idea. Did Mr. Gibbon ever ask what led the people from the country to the towns? He will find, if he asks, that sanitation had nothing in the world to do with it. If the advantages of the town could be brought into the country the people would soon all be streaming back again, sanitation or no sanitation. What would the people do in the country without occupation? By our foolish legislation we have allowed the land to go out of cultivation. There is now almost nothing to do in the country. We shall have to revolutionise it again before we can hope to see it peopled. How to do this is now the problem to solve. There is no occasion or need for any question of sanitation.

Dr. McManus thought the Local Government Board was overladen with work, and a 'Public Health Department' should be established. The country did very well for a long time without the Local Government Board. It would not suffer one iota if its operations stopped to-morrow. What is a 'Public Health Department' to do? . . . find more work for the doctors? . . . levy more rates on the burdened ratepayers?

The President, Professor Smith, one would suppose from his remarks, had never been in the country at all. He reminds me very forcibly of a man from London, who was once staying with us. It was springtime, and a friend was with him in the garden. The potatoes had come through the ground in a good many parts of the garden. He looked at them and said to the friend, 'What a lot of strawberries there are in this garden!' There was not one. This is good enough for a cockney! Professor Smith suggested sanitary inspection. We have sanitary inspection! And who are the inspectors? And what do they know? Just as much about sanitation as the President knows about the country. We country folk want nothing so much as to be left alone.

Dr. Banks said their description of the farms did not apply to Scotland. No, and it does not apply to England. The country people are just as clean (if not cleaner) in England as they are in Scotland, and certainly the farms are as good in this matter as the towns. A man from Bath once asked one of our farmers what he did with his sheep at night? I wondered the farmer did not laugh. I refrained myself from smiling, and only waited to see what he would say. He quietly explained to him that they were left in the field at night. The man from Bath, and he was a clergyman, was quite satisfied. I could scarcely withhold the question, Do ye think he puts them in his parlour? Oh that people would only talk about things they understand!

Professor Smith proposed a resolution asking the Council of the Institute to call the attention of the Government to this question. This was certainly a wise and prudent thing to do. The Chairman concurred with Captain Phillips, and Sir H. Littlejohn seconded the resolution, and it was adopted.

So much for the paper and the discussion on Preventive Medicine and Vital Statistics. It will be seen, the real question was not so much as touched. Next came papers on the advantage of teaching hygiene in the schools. A discussion followed the papers, and Mrs. Windley contended that a beginning should be made by teaching the women of the nation. She also advocated a 'Ladies' League.' This is refreshing certainly—more officials, more leagues, more associations.

Mr. Sandford remarked that the elements of hygiene were already taught, and the Rev. W. W. Young objected to learning by heart. How otherwise would he have them learn?—by art? The Chairman's conviction is edifying. A resolution followed to the effect that the Board of Education should be moved in this direction. '*Parturiunt montes, nascetur ridiculus mus.*' Here are men, educated and reasonable, brought from the four corners of the British Isles to discuss the question of 'Preventive Medicine' and 'Vital Statistics.' The latter part of the subject is never so much as named. The former part produces nothing definite. What has there been in the discussion in the nature of a practical, tangible result? What is the thing *that is going to prevent disease* and to promote health? There is nothing in all that has been said upon which the mind can fasten?

Medicine, as we have seen, is not a science. It is not in its nature, therefore, to specify any means by which disease can be lessened, or health can be promoted. But here is another illustration:

'At the Congress of the Sanitary Institute at Manchester yesterday, Dr. S. Moritz, Manchester, said that since Koch's discovery of the tubercle bacillus the belief that tuberculosis was a preventable disease had become indisputable. Tubercle bacilli found their way into the air in the sputum of phthisical patients. With a great number of consumptive patients in our midst, as a consequence of the unpardonable levity with which all regulations against expectoration were disregarded, every one almost daily came in contact with or inhaled some tubercle bacilli. That we did not all become tuberculous was due to the fact, that healthy mucous membranes offered considerable resistance to the entry of the germs. The open-air or hygienic and dietetic treatment had been universally acknowledged as giving greater benefit than any other remedies that had been tried.'

The authorities are much divided about Koch. We deal, however, with the paragraph as it stands. Dr. Moritz says that since the discovery of the 'tubercle bacillus' the belief that tuberculosis was a preventable disease had become indisputable. The idea here is, that the disease is caused *ab extra*. The *causa causans* is a 'bacillus.' This 'bacillus' is produced somewhere outside the patient. It is transferred from its habitat to the spot where it works its mischief. There is no man living able to prove a single one of these propositions. Have we, for instance, any proof that it is *ab extra*; that it is a bacillus; and that transference is possible? Where are the facts to warrant the belief? I believe that consumption is preventable and curable; but not on the bacillus principle. We must, however, not discuss this question. It lies outside our province at present.

Dr. Moritz next says, 'Tubercle bacilli found their way into the air in the sputum of phthisical patients.' How does the doctor know this? We will suppose that bacilli were in the sputum. How did they get there? Were they generated there? Were they of spontaneous growth? Did they propagate themselves? Had they power to leave the sputum? Suppose they could, how would they get lodged on the lungs of another person? These questions are all unanswerable.

The doctor's next statement was, 'That because there are great numbers of consumptives, and they spit unrestrainedly, everybody more or less inhales tubercle.' One would suppose that such a statement overreaches itself, and the doctor would hardly have ventured to make it. The further discussion is obviated by what we have already said and read.

The explanation of the fact that notwithstanding the great risks we do *not* become tuberculous is beautiful. We have power to resist the enemy. In other words, he is harmless. Then why this bother? Why spend so much time in fighting an imaginary foe? Would not the plan of discussing how to become stronger and stronger be far better?

'The open-air or hygienic and dietetic treatment had been universally acknowledged as giving greater benefits than any other that had been tried.' This is his last statement. I confess to being a little puzzled. I do not see, to start with, how 'open-air' can be synonymous with hygienic and dietetic. I know that open-air conduces to health. I know that proper food does so too. This is generally true. That it is generally acknowledged is another matter. But now what is proper food? There would be many opinions as to this. I should say uncooked fruits would be the best food, but I should not find many to agree with me.

The point which we want to make with respect to all this is that there is nothing *definite* in the teaching of the medical faculty. We look for it in vain. Suppose, for the sake of argument, that sputum does convey tuberculous bacilli, what have we had that is practicable in the way of *preventative?* Absolutely nothing. The Americans have taken the matter severely in hand, and, I believe, the man who spits is now liable to a severe fine as punishment. Spitting is a dirty habit, and should be discouraged; but the effort to put it down is hopeless. A better way would be to teach people so to eat and drink as *not to require to spit.* The animal does not spit. Why should man do it?

CHAPTER III

SANITARY SCIENCE SECOND

WE need not follow further the sayings and doings of those who distinguish between medicine and sanitation. We may now see what those have to say whose occupation is wholly concerned with sanitation.

The following paragraph, taken from one of the daily newspapers, will serve as a peg on which to hang a few thoughts. It is well up-to-date.

'SANITARY CONGRESS.

'Interest at the congress was largely concentrated yesterday on the discussion of sanatoria for consumptives in a combined sitting of the sanitary, science, and engineering sections.

'Sir James Crichton Browne again presided. It was unanimously recommended that in the interests of public health the laying down of edible shellfish in sewage-polluted creeks be prohibited by law under heavy penalties, and that unpolluted layings and storage ponds be protected by law from sewage pollution.

'On the subject of sanatoria, oral addresses were delivered by Doctors Pattin, Moritz, Hunting, and Rhodes; and four papers were read, dealing chiefly with the construction of sanatoria by Dr. Scurfield

Sunderland, Messrs. Hull, Hardisty, and Cross, architects, and Dr. Welsford.

'Dr. Nocard, representing the Académie de Médecine (Paris), opened a discussion, giving extremely important particulars of recent experiments in various parts of Europe, proving the transmission of human tuberculosis to animals and *vice versâ*, thus directly controverting the dictum of Professor Koch.

'The congress was brought to a conclusion by an address by Sir William J. Collins, M.D., late chairman of the L.C.C., entitled, "The Man *versus* the Microbe."

'He protested against surrounding the science of health with a mystic sacerdotalism, and remarked that since legislation had come to concern itself with the health of nations as much as with the wealth of nations the medical man should take his place among the councils of the nation and discuss public health questions on the public platform.

'We were now living under the dominion of the bacillus. That blessed word met us at every turn and shadowed us in every department of public and private life.

'The germ was too much with us, and perhaps we sometimes lost sight of the man amid the luxuriant and magnificent flora of the bacteriological laboratory.

'But the soil had to be studied as well as the seed. Healthy blood was fatal to disease germs. Predisposition was a potent factor too little considered.

'Sir William suggested that bacteriologists stood too close to their special study to see it in proper perspective, and argued that in the case of tubercle, and cholera, and plague, and in other diseases of man and animals, the sanitary methods of cleansing the environment had been successful in stamping out disease when methods of the bacteriologist, which transferred the battleground with disease to the blood and tissues of the individual, though apparently successful in the laboratory, had failed in practical application.

'Some would-be reformers, in their perfectly proper zeal against bacilli, were in danger of underrating the potency of filthy conditions and removable extrinsic causes in disease production. The anti-sanitationist was the most pestilent of all the "anti's." The true sanitarian, like the true philosopher, should be a man willing to listen to every suggestion, but determined to judge for himself.'

The first idea here is that *sanatoria* for consumptives are desirable. Now why? We do not gather the reasons from this report. They were no doubt expressed; but we are not in a position to criticise. The usual reasons given may be classed under two heads: (1) To prevent contagion; (2) To care for the patients. We shall have something to say later under these two heads; so we will now merely affirm that the results of these schemes are not sufficiently satisfactory to justify them.

The second paragraph refers to protection from pollution. We shall discuss this point fully later; so we only notice that fish live on the very stuff which these sanitarians seek to exclude!

Then we find a representative from the Académie de Médecine at Paris, Dr. Nocard. He controverts the dictum of Koch. He has communicated human tuberculosis to animals, and animal tuberculosis to men. This, however, is not exactly what he says. He has proved by experiment that these things are possible. We shall not notice anything more here than this. Two doctors are at opposite poles. They are both 'specialists' in their one particular branch. They are at 'daggers drawn.'

Sir W. Collins discourses on 'Man *v.* the Microbe.' He claims for the 'doctor' that it is time he took his place alongside his fellow-men. We hail this sentiment with pleasure. The 'doctor' has remained too long shrouded in a mysterious halo. It is, indeed, quite time that halo was dispersed, and he did assume the position of an ordinary mortal. The advice, however, implies that things are not what they ought to be. The 'doctor' ought to take the position of one who is ready to learn, and willing to reason about things. His knowledge must no longer savour of mysticism. Health is a thing about which we all ought to know what is to be known. The 'doctor' should be only a man who, by reason of his superior knowledge, is able to give good advice. In all this we applaud Sir William Collins.

He confesses that the 'bacillus' has been brought too much to the fore. He now speaks of it as a 'germ.' This is somewhat puzzling. The microbe, bacillus, germ are, it seems, convertible terms. Is this so? A 'germ' is, properly speaking, the beginning of a seed's growth. There must be a seed before there is a germ. 'Bacillus' and 'microbe' are two names for the same thing. These words are supposed to describe a very minute *something*—it is difficult to say what. The only point of importance is that it is *alive*. It has the property, apparently, of propagating itself very rapidly. A 'germ' has *not* these properties. The words are quite modern. The point I wish to make is that Sir William is not at one with his brethren. He thinks the study is too much devoted to *microbes*, and too little to *man*. He would have the doctor study *man* rather than *bacteria*. Here he is quite right. He makes two statements that are worth consideration: (1) Healthy blood is fatal to disease germs; (2) Predisposition is a potent factor too little considered. What Sir William means by (1) is simply this. If a man be *well*, he cannot be *ill*. This is self-evident. The obvious inference is: If you know how to *be well*, you need not study *disease*. This renders the study of 'bacteria' perfectly useless. The pity is that Sir William did not go to the end of his logic and say these things plainly. Why did he speak so timidly?

We suppose he means by (2) that if a man be not robust, he is more likely to be ill. This also is perfectly true. Here again he should have gone on to reason out the methods for *becoming strong*. A man, for instance, is born of drunken parents, and inherits their weakness. He has not the strength to be sober. That may be true, but he can *acquire* the necessary strength.

Sir William chastens the bacteriologist. He thinks he forgets the *man* in studying the man's enemy. He thinks disease is better stamped out by sanitation than by work in the laboratory. This might be true if the disease were an outside thing, generated *ab extra*. It is an inside thing, generated *ab intra*. It is this initial mistake which, in my opinion, is the occasion of so many mistakes. How can racers attain the goal if they are running in the *wrong direction?*

Sir William describes the anti-sanitationist as the most pestilent of all the 'anti's.' No sensible man can be against true sanitation. What, then, does Sir William mean? Every sensible man will be against needless labour and expense. This is exactly what sanitation too often means. His definition of the true sanitarian will do. He is a man ready to listen, but ready also to judge. He accepts no man's *ipse dixit*, calls no man 'master,' pins his faith to no man's coat-tails. In this Sir William speaks wisely and well. And here is precisely the reason for *my writing*. I prefer independence of thought. I would advise all to persist in demanding it. Only let men see to it that they *do* think. Dr. Guthrie says, 'It is harder to hammer out thought than iron.' And this is precisely where the difficulty lies. People will not think, but are only too willing to have the thinking done for them.

Sir William, in my opinion, is a little in advance of his brethren. He speaks ominously, but evidently represses his real opinions. The following extract from the *St. James's Gazette* will illustrate this further:

'The sayings and the doings of the Sanitary Congress have kept up their interest to the end. The last contribution to the suggested welfare of the world took the form of an address by Sir William Collins on the subject of "Man *v.* Microbe." We are still not very clear as to the speaker's meaning, for he seems to have had so many meanings. Perhaps, reduced to a bare and dull simplicity, very different from the fairy fancy or the sesquipedalian phrase with which they were actually embellished, his arguments are that prevention is better than cure and that it is even more important to remove the causes of disease than to dose the patient. If that is so, his eloquence is only equalled by his wisdom, and we are duly grateful for the statement of an axiom that is beyond controversy. There is, however, albeit Sir William did well to make his point under the prevailing conditions of theory and practice, something to be said on several sides. We are quite of his opinion that to underrate the potency of filthy conditions or the capacity of the healthy body to resist bacterial assault is the gravest blunder. But we are by no means sure that there is any particular reason for thrusting this obvious doctrine down throats which are really very well aware of its truth. The fact that bacteriology as a science which now absorbs the attention of many medical men has made tremendous advances is a poor sort of reason for supposing that other issues are entirely obliterated. It may be that some time, better spent in other research, is wasted in an interesting pursuit and that fads and faddists are rather to the fore, but such is, after all, merely the history of every useful movement during its progress, and we venture to say that at no time has the essential importance of sanitation been more widely recognised than it is to-day. When we come to the question of the *corpus sanum* there is nothing to which we are inclined to take exception in Sir William's argument. Indeed, judged from an academic standpoint, its sense is as good as its sound. From the practical point of view, however, the thing has a different look. What would Sir William do to make the body healthy? Short of a total regeneration, a fresh start *minus* hereditary taints, crowded cities and that far too strenuous struggle which is the lot of many of us in this life, there is little enough which can be done. Had this visionary been lecturing to the Utopians he could scarcely have formulated a doctrine less practical for our intents and purposes. Anxious as we are for that physical training of the race which should have results even farther reaching than the provision of an amulet against the savage microbes, we should not be very sanguine, even when our hopes were realised, of any great decrease in the number of consumptive or scrofulous persons. We are, after all, more ready to trust to the advance of medical science and the investigations of the poor bacteriologist for a lowering of the death rate. "Theology," in the term of this dogmatic discourse, "had failed to explain pathology by a reference to the infinitely great, and now bacteriology had found salvation in the infinitely little."

We are astonished, in more senses than one. But it may be that a sad inability to distinguish the head from the tail of this sentence or to perceive where theology—directly—comes in has obfuscated our average intelligence. Sir William was at least bold in condemning, in sounding phrase, "the old theory of zymotic diseases as a leaf torn from the Mosaic cosmogony, and in itself" (the theory or the disease?) "as gratuitously malevolent," and in protesting "against surrounding the science of health with a mystic sacerdotalism." Without a particle of an idea, beyond the simple reduction to a vulgar fraction with which we began our commentary, of the gentleman's meaning, we are content to note his proposal that the medical man should take his place in the councils of the nation. If we have been altogether wrong in supposing that such was to a large extent already the case, we hasten to applaud the idea. It is very obvious that the sanitation of cities and the supervision of the health of the whole country should be undertaken under expert advice. It would never do to make drains, to regulate house room and open spaces, or to control epidemics upon principles totally haphazard.'

The writer of the above evidently does not know how to understand Sir William. He *ought* to have enunciated clearly the *credenda* of sanitation, and made the most of them, and he has done nothing of the sort. He has ventured to do something more than hint that there is a 'fly in the pot.' He suggests even that there is a better way. 'Don't bother so much about the "microbe" and the way to destroy him. I dare not say it, but I mean it, leave sanitation alone, and look after *the man*. Keep him in health, and he will be all right. "Healthy blood is fatal to disease germs."' Go on, Sir William, go on! You are on right lines.

Nothing very definite seems to have followed this Congress. Sir William helped them almost in nothing. The speakers did not help either themselves, their fellow-speakers, or the audience. The speakers talked about pollution, sanatoria, and microbes, but, outside Sir William's speech, there was nothing to show us how to *promote health.* The summing up, indeed, by Sir William's speech seemed to imply that there was a better way, and a better way would be this: Do your sanitary work so far as your convenience and comfort require, but do not expect it to work miracles. It is not in the nature of things to accomplish what you hope from the agencies you devise.

My object in these two chapters has been to illustrate, in a general way, that sanitation cannot be a 'perfect science.' It has for its object the promotion of health. It depends for its principles upon the dicta of medicine; and medicine, as we have seen, is anything but a science. It is at best but empirical. We have noticed that this science, if so it may be called, cannot be a *basis* in any reliable sense. It supposes that the causes of diseases are mainly *ab extra*, and this supposition has no foundation in fact. We have also shown, from the sayings and doings of the 'Sanitary Science Congress'—where, if anywhere, knowledge should abound—that there are no definite plans before the world for ensuring that better times shall dawn.

But what says *experience? Experiantia docet.* What has it to say? We may devote a special chapter to answering this question, so for the present we will leave things as they are.

CHAPTER IV

THE DAWN APPEARING

'It is a long lane that has no turning.' The turn, however, is often long in coming. This has been our experience many a time in life. How long and anxiously have we waited for a turning! how often have we been on the very point of despair, but we have waited on. There are appearances already showing themselves that the turn of the tide may soon be expected. Sir William Collins has given us, as we have seen, some little reason to hope. There is evidence, too, from America (if we may change the metaphor), that the 'Dawn is Appearing.' Do we, then, wish to stop sanitation? By no means. We wish simply to put it in its proper place. It is regarded as the panacea for all our woes, and it is in fact nothing of the kind. We may expect a little convenience and some comforts from it, but that is the most that we can look for. We hail with joy the fact that the right view of the matter is within measurable distance of realisation.

We cannot do better, by way of illustrating this point, than give an article which appeared in the

New York Christian Advocate. As it was written by a *doctor*, it should be recognised as having been written without prejudice :

'FACTS *versus* FALLACIES OF SANITARY SCIENCE.

'If asked what one thing has accomplished the greatest results in the material betterment of mankind during the last half century, the sociologist would probably answer, "Public sanitation," and such answer would challenge successful denial.

'To the student of the subject, looking over what has been accomplished under the head of sanitary science, public sanitation, or hygiene (indifferently called), such results cannot fail to be both impressive and surprising.

'They are impressive because his eyes show him great engineering works constructed under these names, better houses, streets, and surrounding conditions. He finds that people eat better food and drink purer water; he learns that preventable diseases are prevented, or at least their spread limited, that epidemics have become much less frequent and virulent ; while statistics teach him that the expectation of life has increased by years, and infant mortality decreased by a percentage astonishing. They are surprising, not alone for their vastness and importance, but still more that such good could come out of ignorance and error.

'For such student is conscious that the most, if not quite all, of these good things are the results, not of the proper application of the principles of a science, but are the results of the carrying out of a theoretical empiricism based upon wrong premises.

'Certainly no such successful outcome of error is known in the whole history of science.

'To within but a comparatively few years the class of diseases called preventable, contagious, or infectious, the prevention and limitation of which is the chief aim of public sanitation, was attributed by so-called sanitary science to, first, filth (composed of decomposing or decaying organic matter in more or less solid form and certain wastes); second, water (including that used for potable and domestic purposes containing decomposing or decaying organic matter, stagnant water, swamp or marsh water, ground water, &c.); third, air (including the gases of decomposition and other extraneous gases, odours, excess of animal matter, carbonic acid, and moisture or dampness, ground air, miasm, &c.); fourth, the earth (meaning certain vague telluric conditions).

'When we discovered the true causes of these diseases, and that filth, bad water and air, and telluric conditions could not directly cause them, as it was hard to break away abruptly from the ideas and mental attitude induced by long belief and training, we conjured up certain vague, indefinite bodily conditions, which we attributed to the same as causes, and held that such conditions, through weakening the natural resisting powers of the body to disease, tended to make infection more probable in the event of exposure.

'This position was based upon the principle that whatever weakens or lowers the tone of the bodily organism also diminishes the power of resistance to disease, with which power such bodily organism is endowed by nature. There is no reason to believe to-day that our last attitude had any firmer foundation than the first. Practical experience, as well as theory based upon our present knowledge, teaches us that exposure to filth, filthy water, and filthy air does not in itself necessarily lower the tone of such bodily organism. And even if it did our present knowledge gives to vital resistance a firmer foundation than the general tone of the organism.

'The causes, then, of the class of diseases which it has been the aim of sanitary science to limit and prevent being known, what, then, are those causes and what are the relations borne to them by filth, water, air, and telluric conditions?

'Preventable diseases, we know to-day, are caused by minute microscopic organisms belonging to either the vegetable or animal kingdom, and which bear a specific relation to the diseases caused by them. These organisms or disease germs form but a small proportion of the myriads of organisms otherwise similar to them, which perform most important functions, and without which, indeed, the world could not support vegetable and animal life.

'To these beneficent organisms are due the processes of decomposition, putrefaction, fermentation, &c.; and the results of their activities are the splitting into simpler compounds — carbonic acid, water, and ammonia—of dead organic matter. It is through the carbonic acid, water, and ammonia thus produced that the higher vegetation obtains the carbon and nitrogen necessary for its growth, and without which such growth would cease. As animal life is dependent upon vegetable life, its development would also cease. So we thus find in these little bodies, so minute as to be seen only by the aid of the most powerful microscope, not only our worst enemies, but also our best friends.

'On the other hand, our enemies, the disease germs instead of being engaged in building up and supporting life, devote their energies to its destruction or loss. They are true parasites, living at the expense of their living host by taking from it what is necessary to its own growth and development, and harming and destroying it through the products of their existence.

'All of these various organisms or germs descend from like parents; and their existence, of necessity, presupposes a line of ancestors stretching back until lost in the shadow of the same mystery which overhangs the origin of man.

'Each preventable disease is caused by one of these separate and distinct families of germs, and can arise in no other way.

'In order that a germ should cause a disease, three conditions are necessary: First, that the germ should obtain access to the organism; second, that the germ should be in an active or virulent condition—for, owing to attenuation, unfavourable environment, &c., such germs may exist in the organism in a dormant or harmless state; third, that such activity or virulence should be sufficient to break down the power of resistance to such attacks, with which power every bodily organism is endowed by nature.

'Such, then, being the known causes of these diseases, let us consider the relations borne to them and their causes by, first,

'FILTH.

'The conception of what constitutes filth is largely a relative one, training and the personal equation entering largely into the individual definition.

'What appears to be filth to the uninstructed may appear in an entirely different light to one who knows its constitution, origin, and purpose; while, on the other hand, that which may seem the most disgusting form of filth to the more intelligent and the better educated, to the ignorant (who are accustomed to it, who have toward it neither an inherited nor acquired repugnance) it may not seem to be filth at all.

'From a *general* point of view anything dirty—any matter which fouls, soils, defiles, or pollutes, waste matter, nastiness—is filth. From a *sanitary* point of view filth is decomposing or decaying vegetable or animal matter and other matter involved with it.

'Yet as that animal or vegetable matter in its original condition would not be considered as filth, the condition in which it exists at the time must make it so.

'But that condition is simply a step in the chemical processes by which nature changes the matter from its original forms to others, which may again be useful in the great scheme of life.

'These latter forms which appear when nature has finished her work certainly cannot be classified as filth.

'The theory that the preventable diseases originated in filth never seemed logical, even before we knew the true causes of them. Now, as has been stated, we know that, directly at least, it has no relations to those causes.

'It has also been stated that there is no proof of the claim that in some vague, indefinite way the presence of filth lowers the tone of the bodily organism, and thus diminishes the vital resistance.

'Now, there is only one way left in which even any indirect relation between filth and these diseases can be established.

'We know that the disease germs require for their development and life heat moisture and organic matter. Now, these conditions are usually attained in the presence of accumulated filth. It is, then, as the pabulum, or food, of these germs that filth bears the most important relation to this class of disease.

'But even this relation is not such a vital one as may appear at first sight. The little germ, so to speak, has its own notions as to what is clean and unclean, and thrives better upon organic matter which is clean and pure than upon that which is unclean and impure.

'Every accumulated mass of filth, of whatever bulk, is a teeming mass of bacterial or germ life. These bacteria are working under conditions favourable to them; they are performing the functions for which they were created in breaking up organic matter into simpler chemical compounds, which shall be again of use in Nature's laboratory.

'In the struggle for existence which ensues they go to the wall, and we find a good illustration of the doctrine of the "survival of the fittest." It follows, then, that if filth becomes infected with these disease germs it is a danger for a time, but nature has minimised such danger by providing—except under exceptional circumstances—for its destruction. Filth while infected is dangerous in various ways: By being washed over the surface or by percolation through the ground the germs may reach water used for drinking or other domestic purposes, and cause their respective diseases; or infection may result through handling, accidental or otherwise; they may be carried by soiled boots, clothing, or animals; may be deposited on food or in drink by flies; may be conveyed by the bite of the mosquito; when dry may be distributed through the air in dust, &c.

'WATER.

'Water has probably been more blamed as a cause of disease than has filth, and probably with more reason.

'Until of recent years, however, wrong reasons for this blame have been given. It was believed that the organic impurities in polluted waters were in themselves the causes of these diseases, and even to-day the chemist gives his opinion as to the healthfulness of water based upon the amount of organic matter which has been and is in such water.

'In the light of our present knowledge such an opinion, based upon that *alone*, with no knowledge of the source of such organic matter and of the sanitary environment of such water, is utterly worthless. It is now known that the class of diseases in which we are interested are not caused by water because it contains large amounts of organic matter, because it is dirty or polluted, but because there have been introduced into it in some way certain germs which are specific of certain diseases of this class And without the presence of these specific germs in the water, no matter how dirty or foul it might be, it could not give origin to the corresponding specific diseases.

'It is admitted that water may be so foul, that it may contain so much vegetable or animal matter, or both, in such condition, that the drinking of it may cause certain disorders, for the most part reflex or functional in type, in the same manner that similar disorders may be caused by the eating of bad or improper animal or vegetable foods.

'It is possible, too, for such results to be most serious, and even fatal, if in either case ptomaines (poisons generated by certain forms of decomposition of organic matter) should be developed.

'It is also admitted that the continual use of filthy water for potable purposes may interfere with the general health in another way and lead to future organic disease.

'Water is the great solvent within the body, and one of its most important functions is the carrying away of effete and waste material. Filthy water is known to develop certain organic diseases and states of auto-intoxication. It can be said, however, that filthy water is so disagreeable to the eye, to the taste, to the smell, or to all of them, and the effects of its use are so immediately unpleasant, that such use is not likely to be continued, except in cases of absolute necessity; whereas the infected, and therefore far more dangerous, water may be most pleasing to the senses, and in no way give warning of the peril contained. Still under these conditions alone we do not find originating cases of typhoid fever and cholera, which are the water-borne diseases of this class in which we are interested.

'These diseases caused by water mean access to and presence in said water of the bacillus of Eberth and the cholera spirillum, and that these organisms have come down from other cases of the same diseases.

'Their presence in the water is accidental or incidental, and in no way dependent upon the condition of said water as to the amount of organic matter, dirt, or pollution contained.

'Indeed, the results of their presence in so-called pure water are much more immediate, fatal, and lasting than in so-called filthy water. This fact may be explained in about the same manner as the behaviour of the disease germs in relation to filth.

'Stagnant water, swamp or marsh water, &c., is concerned in the development of two preventable diseases—malaria and yellow fever.

'Malaria has always been attributed to such water, but for improper reasons. It is caused, as we now know, by a minute organism belonging to the animal kingdom, called the plasmodium malariæ, and in no other way.

'In order to develop the disease, it is necessary for said organism to reach the blood of the subject, and we know of no way in which this is accomplished except through the bite of a certain variety of mosquito. This method of infection has been established by most interesting and convincing experiments.

'Experimenters have lived for long periods of time in notoriously malarial regions, in which it was almost certain for visitors to contract the disease in its worse forms, with no infection resulting.

'They lived the same kind of lives, inhabited the same kind of houses, ate the same kind of food, and drank the same water as the natives.

'The only precaution adopted was to protect themselves from the bites of the mosquitoes.

'Experiment has been carried still further by transporting infected mosquitoes to regions where malaria has been unknown, and there allowing them to bite persons who have never suffered with the disease, with the result of the development of the disease in such persons, and the finding of the plasmodium in their blood.

'The very recent developments with regard to the origin of yellow fever are very similar.

'This disease was long attributed to the baneful influence of atmospheric malaria. Yellow-fever-bearing mosquitoes are now found to breed in pools or collections of stagnant water, and it is necessary to empty, to drain, to fill such places, in order to get rid of them.

'As to high or low ground water, the only relations borne to diseases of this class is to typhoid fever and cholera, and the only relation to them is through the possible infection of drinking water.

'Both unusually high or low ground water may convey to drinking water, especially that drawn from wells, the germs of these diseases, which, at ordinary levels of the ground water, would not reach it.

'AIR.

'Air is principally composed of oxygen, nitrogen, and carbonic acid. Oxygen is the important constituent for the animal world, and must be present in certain proportion to support life. Carbonic acid is required for vegetable life, and is of no direct use to the animal. Nitrogen is mainly a diluent and modifies the action of oxygen, though certain plants by the aid of bacteria are able to take it directly from the air, and store it up for animal use.

'Besides these main constituents, air contains aqueous vapour, argon, ozone, ammonia, organic matter, salts, &c., besides at different times varying amounts of almost every known substance—gaseous, semigaseous, organic, inorganic, &c.

'Formerly it was believed that the preventable diseases were caused by bad air—that is, air containing too little oxygen, too much carbonic acid, aqueous vapour, and organic matter—by the various gases contaminating the air, especially those arising from decomposition processes of organic matter, by ground air, odours, miasm, &c. We know now that these diseases can be caused through the air only by their specific germs carried in such air. These germs are in the air in connection with other suspended matters, such as dust, sand, soot, pollen of various plants, and particles of almost every conceivable thing.

'With such sand, dust, &c., they may be blown into the mouth and infect through the digestive tract, may be breathed in and infect through the respiratory tract, may be deposited upon the food or in the drink and infect in that way, may be deposited on articles or objects which may be handled or used in such ways as to cause infection.

'Only in some such way, though, can the infection of these diseases be caused through the air.

'Of course, too little oxygen may interfere with health, and even cause death; various gases, some arising from decomposition of organic matter, present in great excess, may have an actually poisonous effect upon the system to a greater or lesser degree; but it can only be very exceptionally when these conditions will be serious enough to be important.

'Except under those conditions ordinarily efficient ventilation will prevent any ill effects of consequence.

'The body has power to accommodate itself to varying amounts of aqueous vapour in the atmosphere, without any interference with its health.

'The trace of organic matter practically always found in air, unless infected, is harmless.

'Ground air, especially in populated districts, is what may be called "bad" air, but simply requires dilution to make it fit for use.

'Bad odours, smells, &c., have no relation whatever with the preventable diseases, and can have but the most transient effects upon the general health. Odours may be unpleasant, and, indeed, may be bad enough to cause some slight and temporary physical disturbance, through reflex action of the nervous system, but they do not and cannot cause disease.

'Belief otherwise has been one of the greatest as well as most expensive of our sanitary errors, for though some good has been accomplished indirectly through it, yet that same amount of good could have been accomplished at much less cost had we known the truth.

'Hardly a city to-day but has in its sanitary code a law or ordinance regulating the trade of plumbing.

'In this ordinance will be found the strictest provisions as to details of quality and strength of pipe, location, trapping, and venting of pipes and fixtures, &c.; its object being, as has been stated, "to prevent illness and death entering a house through the sewer pipe."

'Some cities even require a strict examination of all persons desiring to enter upon the trade of plumbing, on the ground that their functions have such vital relations to the public health that only those who have been specially trained and educated should be allowed to do such work. The existence of such laws is simply a survival of the old idea of the preventable diseases originating from filth, filthy water, and filthy air. When sanitarians originated and put in force such legislation they meant well, and were only acting up to their lights of that time; but its existence to-day is entirely unjustifiable, and only inflicts upon the householder an unnecessary hardship and expense.

'All such legislation is out of place in the ordinances of health departments. Sufficient provision should be made in the building laws to provide for the proper carrying off of the sewage from houses and for the prevention of the ingress of unpleasant odours from sewers; anything further is superfluous.

'The truth is that life and health in our homes are in far more danger from illuminating gas and its piping than from sewer air and plumbing. As sanitarians were responsible, in the first place, in teaching the causal relations between disease and these different forms of filth, it is incumbent upon them, now that they know better, to disassociate them in the public mind.

'The task will not be an easy one, however, for it is an error which has taken deep root.

'How far it may carry otherwise intelligent people may be seen by the following illustrations:

'SPECIMEN ILLUSTRATIVE FACTS.

'The writer has personal knowledge of a certain sewage disposal plant which has recently been a matter of controversy. Such plant was of the intermittent sand filtration type, was well located, ample in extent, upon a suitable soil, and yielded an effluent, made by nature's own process, clear, pure, and sparkling, better chemically and bacteriologically than the waters into which it flowed.

'As a potable water such effluent would have been acceptable upon any table had its source been unknown.

'Yet, forsooth, because persons passing along a road, and possibly two or three neighbours, under certain conditions were able to smell certain odours, which they probably could have found quite as often in their own kitchens—that is, the odours of dishwater and boiling cabbage—therefore it must be a menace to the health of the neighbourhood, and was so presented by the intelligent grand jury of the county in which it is located.

'A certain river which has been under much discussion for the last ten years was once as lovely as its name.

'Its pure, limpid waters, its sloping banks, and beauties too many to mention, made it an invaluable possession for any section or community.

'It should have been cherished and protected as its most valuable asset. Yet on account of the growth of towns, the building of factories, and the general practice of the accursed doctrine that rivers are natural sewers, and that man, therefore, has the right to cast his filth into them, that river is now an open sewer, its contents a mixture of sewage, manufacturing waste, and a goodly proportion of everything that is vile.

'It is discoloured and filthy, disgusting to the sight and foul to the smell—a public nuisance if there ever was one, and of far-reaching extent. During these years most laudable efforts have been made to abate this nuisance and to restore, in so far as possible, the river to its pristine condition. Enlisted in this cause have been some of the most intelligent, the most public-spirited, the best citizens of the valley. Governors have written messages, commissions have been appointed and reported, legislative and other hearings and meetings have been held, columns have filled the newspapers, and discussion has never ceased—all in the cause. The chief argument advanced, however, whether in writing or speech, why the river should be purified, has ever been its danger to the public health as a possible and even likely cause of an epidemic or pestilence.

'Now, it would be most interesting to have some of these gentlemen explain just how that might come about. The *modus operandi* of the conversion of the threat the river has been so long holding over our heads into a real, actual epidemic or pestilence, would be of the most intense scientific interest. Its discoverer would leave a name which would live in history. The writer is, however, obliged to confess with regret inability to win such a prize.

'It is true that the river is filthy, but filth does not cause pestilence. Its waters are foul, polluted, and infected with typhoid fever at least, but the water-borne diseases—typhoid fever and cholera—could only become epidemic from such a cause through the use of said waters for potable purposes, and no one drinks them.

'Even the malaria-bearing mosquito is too dainty a bird to breed in such waters, which accounts for the fact that less malaria exists now along said river than was the case thirty years ago, when no such condition of affairs existed. The odours arising from it are not those of 'Araby, the Blest," but odours do not cause pestilence.

'It is true, of course, that an individual or two, by falling into the river and swallowing some of the water, or in some such way, might develop typhoid fever, but an isolated case or two does not constitute an epidemic. Disgusting appearance and smell may, in those unaccustomed, excite certain transitory reflex and psychological disturbances, but habit overcomes these. People live and enjoy the best of health in slaughter-houses, rendering establishments, sewers, on sewage farms, &c.; then why not upon the banks of this river?

'The writer himself is a living evidence of its possibility, having lived thereon during the last four summers, with no more serious result than a rather excessive expenditure for perfumery.

'But perhaps the aforesaid gentlemen are apprehensive of a miracle, or the development of some brand new disease, of which none of us have ever heard before, or possibly they are disciples of that "science" which is founded upon the "principle" that "whatever is believed to be will be."

'In all soberness, the condition of the river is such as to call for the application of the proper remedy, but let those engaged in such praiseworthy undertaking base their arguments upon logical grounds, and not appeal to the ignorant in the name of a mistaken and misunderstood science. Their cause can better be advanced by basing it upon grounds of public decency, public morality, and public economy than upon what in this day and age can only make such cause ridiculous.

'THE EARTH OR CERTAIN TELLURIC CONDITIONS.

'Upon this point there is hardly space or necessity for speaking, as practically all the theories based upon it were due to superstition or ignorance.

'Now, if filth, filthy water, filthy air, and telluric conditions have such slight relations to true sanitary science, and if the preventable diseases, the limitation of which is the chief aim of public sanitation, are due entirely to certain specific organisms, the presence of which are necessary for their development, what, then, are the most important means by which it is possible to so limit such diseases?

'Briefly these means are as follows (these diseases will be spoken of as a class, and the chief general means given first; special means pertaining to individual diseases later):—

'1. A health department, with the necessary powers granted it by law, properly organised and equipped, and with a *personnel* properly educated and trained in scientific sanitary work.

'As sanitation is now a more exact science, and as its methods and means of use have become and are becoming more exact and scientific, it is but reasonable to require of those engaged in its work not only a thorough understanding of those means, but also a scientific application of those means and methods.

'2. Notification. In order to put into effect the measures necessary, the health authorities must be promptly notified of the existence of preventable disease.

'3. Every case of preventable disease is a focus for the development and distribution of the specific germs of that disease.

'As long as such distribution is allowed to continue, such case is a danger to the public health by making it possible for the development of new cases through infection from it, which in turn become new foci of development and distribution.

'In order to prevent this danger, therefore, it is necessary to isolate such case so that just as few persons as possible shall be exposed to infection from it. This is best done by removal to a properly constructed and conducted isolation hospital. If this is impossible, then the best attempt possible must be made to isolate in the patient's own home. But true sanitary science, however, can allow no excuse for the lack of such an essential as the hospital.

'4. Disinfection. When the patient is removed and isolated properly practically all direct danger to the public health from such patient ceases. An indirect danger, however, remains in the infected premises from which the patient has been removed.

'Disinfection, then, is the process of destroying such infection by the destruction of the disease germs there existing.

'This is accomplished by the proper use of certain chemical substances—gaseous and otherwise—by properly trained officers, by heat, and by sunlight, nature's own disinfectant. Any intelligent person can understand how important a link in the chain of prevention this process must be, and how vitally important its proper administration. Too often, however, it is entrusted to one whose training possibly has made capable of distinguishing a pile of filth or an unpleasant odour, but who has no true conception of the cause of the disease, how it is possible to destroy it, and the means to be employed. In such hands it is more a ceremony of incantation than a scientific process.

'5. Observation. After disinfection the next step is to keep under trained observation those persons who have been exposed to infection, either through patient or premises. The object of this is to isolate any such person who shall show symptoms of the development of such infection promptly, and with the minimum of exposure to others.

'SPECIAL MEANS PERTAINING TO INDIVIDUAL DISEASES.

'1. Smallpox. In this disease we have a special means of protection and prevention, which is practically perfect—vaccination.

'No person efficiently protected by vaccination will contract smallpox, and even if such protection be not efficient enough to prevent the disease entirely, it will at least modify it to a greater or less extent, according to the degree of efficiency existing.

'All that is necessary, then, to extirpate this disease from the world is the efficient vaccination of its population.

'As this has so far been found impracticable, then in every case of the disease at least, besides the general measures above alluded to, it is essential to protect by vaccination all those exposed or likely to become so.

'2. Typhoid fever and cholera. The chief danger of infection in these diseases is from the discharges of the bowels, and of the kidneys in typhoid fever.

'The germs of these diseases must be swallowed in order to produce the diseases. If these discharges are not properly cared for the germs may obtain access to the drinking water through sewage or drainage, or by domestic use of such water, or by carriage by flies, or by deposition when dried, in connection with dust, may infect either drink or food.

'The two important measures, then, in the protection of the public health with reference to these diseases are the proper disinfection of the discharges of all patients suffering from them and the safeguarding of the water supply. Probably at least 95 per cent. of all cases of these diseases come directly or indirectly from infected water used for drinking or domestic purposes. It thus appears how vitally important it is that water so used should not be infected.

'The source of supply should either be such as cannot be so infected, or if already infected or likely to become so its waters should be subjected to some process of purification which would remove or destroy the germs of these diseases, if present.

'3. Tuberculosis. The danger of infection in this disease is contained chiefly in the sputum of those afflicted. If this is distributed around promiscuously it becomes dry, and the germs which cause the disease, and which, unlike many others, are not destroyed by dessication, become associated with the dust and other suspended matters in the air, and are breathed in through the respiratory tract, or taken in through the digestive tract, or deposited in food or drink, or deposited upon articles which are handled, &c.

'The only special measure of protection necessary in this disease is the proper disinfection or destruction of the sputum; the only general measure the prevention of dust.

'4. Malaria and yellow fever. The only source of infection in these diseases known to us being the mosquito, all our preventive measures should be directed against him. The most effective are the destruction of the mosquito, the removal of his breeding-places by drainage or filling, and the prevention of his infection by making his access to patients suffering with these diseases impossible.

'SUMMARY.

'1. Sanitary science is based upon, and its results are due to, attempts to suppress or to limit the spread of preventable disease.

'2. It was formerly generally believed, and is still believed by many, that these diseases were directly or indirectly caused by filth, filthy water, filthy air, and certain telluric conditions.

'3. It is known to-day that they are caused by certain minute organisms belonging to either the vegetable or animal kingdoms, and in no other way.

'4. The relations between these disease organisms and filth, filthy water, and filthy air are no closer than to organic matter, which is not and cannot be regarded as filth, and to what is considered to be pure water and pure air. Between them and the vague telluric conditions alluded to we know of no relations whatever.

'5. Warfare waged against filth, filthy water, and filthy air is not sufficient to protect the public health from preventable diseases, and is only incidentally of any benefit.

'6. The suppression and limitation of spread of these diseases require the scientific application of certain definite procedures to each case and its cause.

'In conclusion, it is the hope of the writer that nothing said above may seem in any way to disparage warfare against filth or to minimise its importance. Cleanliness, public and private, is demanded for moral, mental, and physical reasons, which are strong enough in themselves not to require any false aid. Its cause cannot be injured by the truth being known and falsehood dispelled.

'On the other hand, the truth will greatly benefit and strengthen sanitary science. Its cause has always been weakened in the minds of the more intelligent, and has failed to secure all the support it should have, because its theories so disagreed with the teachings of experience.

'Now, with knowledge of the facts pertaining to each, let both causes advance, each striving in its own sphere for the betterment of mankind.

'JOHN L. LEAL, M.D.

'PATERSON, N.J.'

I have given this article in full, because it is written by one in full sympathy with sanitation. He simply wishes to restrict the work of the sanitarian within its legitimate bounds. He would sanitate on sensible and reasonable lines. There is a moral and civilising aspect of sanitation, and against this *he* has nothing to say, and *we* have nothing either. We may take this as an axiom in all our aims—*mens sana in corpore sano.* Whatsoever, therefore, tends to the physical, mental, and moral improvement of man must be wisely done.

While we notice the commendable aspects of this article, we must not overlook its defects. The writer is a doctor, and he writes with all the feelings and prejudices of a doctor. This is only natural. My notion is that if he had been a layman his article would have been more perfect. I will only now notice one or two of the matters in which, to my mind, the article needs rectifying.

The first of these is the notion that diseases are *ab extra.* He clings to this notion. Disease is caused by germs. These germs get into the air, and are breathed into the system. In this way, however, they would enter the *lungs only.* And we take other diseases besides those of the chest.

He forgets that diseases are *ab intra.* He admits that there is 'heredity,' and that this implies a disposition to take on certain diseases. The logical issue of this is, that there is nothing to be done. In this case sanitation is hopeless. What can we do if the seeds of diseases are planted in us at our birth? Absolutely nothing! If the seeds are there they will germinate and grow. This cannot be otherwise if the soil be suitable. If the soil be not suitable the seeds will die of themselves. And practically it does not matter whether the seeds be there or whether they are breathed in through the air. What, then do we mean by the expression *ab intra?* We shall answer this fully by and by.

He hardly realises the difficulty which the *nature of life* implies. Dr. Virchow said, the last time he was in England, 'I have been a student of the question, "What is life?" for these fifty years, and I am as near a solution as when I started.' *We do not know what life is.* This means really that we do not know what disease is. This, again, implies that we do not exactly know what causes it. We may *think* it is this, that, or the other thing, but we do not *know* exactly. This the doctor does not seem to realise. He would hesitate otherwise in laying down positively that some germ is the cause.

My object, however, in giving this article is to illustrate the point—and this it does admirably—that the doctors are beginning to see that we may not expect everything from sanitation that is claimed for it. This, following on Sir William Collins's address, is cumulative. We must hope that opinion on these matters as time goes on will improve more and more.

But why should we trouble about this matter at all? The question is not inappropriate. Our object is to substitute right ideas for wrong ones. We need to know what is *false* that we may seek what is *true*. If the present methods of sanitation, though pleasant enough maybe in their operation, do not attain their object, and we know they do not, we shall probably be induced to seek another and a better way. say *probably* advisedly, because there are so many obstacles in the way. It is not in *rerum natura* that people will learn new ways all at once. They are 'rooted and grounded' in their manner of living, and it will not be an easy matter to effect a change; *aber nil desperandum.*

CHAPTER V

"EXPERIENTIA DOCET"

MOST of our proverbs are not absolutely true; some are not at all true; and some are only partly true. The proverb which stands at the head of this chapter is one of those which are only partly true. Experience is sometimes the only, often it is the best, and always it is a good teacher. But many will not learn, whether experience teach or not.

We have seen that medicine is not a perfect science, and, though prior to sanitation, it is not an unerring guide. We have seen, too, that sanitarians themselves are not sure as to their aims and objects. And we have shown further that the doctors are beginning to see that sanitation, even when it is all that could be desired, has removed nothing which operates injuriously. And so here we ask, What has experience to say on these matters? We have had several years of this improved sanitation, are we any better for it? The sanitation of the towns is said to be now almost perfect. Are the people any better physically, socially, or morally? Are they better than the country people? We are told that in the matter of sanitary arrangements the towns are far ahead of the country. Then are the towns-people in better health than the country-people? And are the country people any better off for the little sanitation introduced among them? We have learnt nothing, almost nothing, from our experience in these matters as yet. We hope, however, the time is at hand when we shall do so, for there is a needs be. *Necessitas legem non habet.* Let us, therefore, proceed to see how *Experientia* in these matters *docet*, so that we may try to learn better ways.

Dr. Leal, in the article previously given, says: 'If asked what one thing has accomplished the greatest results in the material betterment of mankind during the last half century, the sociologist would probably answer "Public sanitation," and such answer would challenge successful denial.'

The doctor would like to claim this statement as true. He does much by way of emphasising it. Unfortunately, however, what he further says disproves it. He is, in other words, condemned out of his own mouth. We may admit that sanitation in New York is so far perfect, and that much comfort has come out of it. We may also say—and I speak from what I know—that the American Hospitals and Infirmaries are as perfect as human ingenuity can make them. New York is a city of big things. But are the New Yorkers a healthy people? I answer that question by an emphatic *No*; they are not a healthy people. Dr. Leal says, amongst other things, 'He finds that people eat better food, and drink purer water; he finds that preventable diseases are prevented, or at least their spread is limited; that epidemics have become much less frequent and virulent; while statistics teach him that the expectation of life has increased by years, and infant mortality decreased by an astonishing percentage. . . .' I do not know what New York *was* years ago. I only know what it was when I was there four or five years ago. There were, I should say, many more diseases in New York than in most modern cities. About every third person was suffering from what is called 'nasal catarrh,' —issue, I should say. There was scarcely a healthy-looking person in New York. I had no means of judging save only from observation. This, however, is the upshot. Sanitation there? Yes, in perfection. Health there? No, not in any way that is remarkable. I have gone into other towns and villages, as in France, and I find no appreciable difference whatever in favour of New York with the perfect sanitation.

America—and particularly the States—is, in many things, in advance of Europe. I was surprised, indeed, at the many modern appliances to be seen at every turn in Toronto. It would seem, indeed, that the Canadians could boast of possessing many more conveniences than are enjoyed even in London. I mean that these conveniences are in more general use. I found the telephone, for instance, in such houses as would not think of having it in London. They did not seem to be behind us even in this matter of sanitation; but I failed to see in this question of health anything extraordinary.

Let us see what obtains generally. Let us go, for instance, to the mountains of Switzerland. What obtains there? I have been again and again to Switzerland, and know almost every part of it. And what? Are they more healthy? By no means. We go to the altitudes of Switzerland because of the pure air. The sanitation often is all that you could wish. There is always plenty of water, and all waste can easily run away. No water could be better. Pure air, pure water, no smell, and yet *sickly people!* How is this?

I was away from home a little while ago, and was staying on the Cloudside, in North Staffordshire. It is as pretty a spot as any in England, enjoying an altitude of some thousand feet. Pure air, pure water, and no drainage needed, for there were almost no houses. I dare say—indeed I know—there were such drains as would carry away all waste water. The subsoil was sand, and everything was quickly dry; and yet what was the fact? The people looked no better, and the children were as sickly as those of other districts. How is this? It is clear that sanitation, either absent or present, makes no real difference in general health.

There is a lady with us just now who has been staying at Whitby, in Yorkshire, and she speaks of the children there as being, if anything, worse than those of the poorer streets in London. How often, indeed, has it to be remarked that the residents of our watering places are not a whit more healthy than those who go to seek health at them. The same thing may be said of such places as Aix-les-Bains and all those other places where people go 'to drink the waters.' *The secret of health is not in sanitation.*

But further. *Experientia docet multum.* We must, in order to be in a true position, compare present things with past. 'The proof of the pudding is in the eating.' We have been eating our pudding, and the ingredients have been more pleasant to the taste than satisfactory to our pockets. And how about the digestion? Aye, *there is the rub.* Some of the items of our food trouble it.

There is a wail now going up that 'we are not as a nation expanding.' A few years ago it seemed as if the whole world would not contain us. We must have more and more colonies to find room for our surplus population. This state of things obtains no longer. We have room enough and to spare. We have ceased to grow. It was only the other day a writer was complaining that we should soon be like the French. France has not made any progress forwards for years. The population does not increase. Its birth-rate has not kept pace with its death-rate. We can scarcely say this yet, but things are tending in this direction. The birth-rate is decreasing, the death-rate is increasing. The reflections on this fact are not at all pleasant or salutary. What can we think? It is clear, whatever may be said to the contrary, that sanitation has done very little for us, vaunted though it has been.

And then the average age of the nation is going down. It was thirty-five years some time ago. To-day it is thirty-one. This is a very significant fact. When I came to Brigstock thirty-four years ago there were thirty widows whose average age was seventy years. To-day there are not ten that would average that age. In the neighbouring village of Sudborough, about the same time, there were eleven men that would aggregate 884 years. To-day I do not think there is an old man of eighty in it. At Stanion, our other village, the same kind of thing obtains. There are only two men over seventy.

Then as to the physique, what can we say? Are men what they were? To my mind there is so much difference for the worse, that one man thirty years ago would do as much as two could do to-day. There is no comparison, but a great contrast, between what men are and what they were. An old man said to me the other day, 'Lord bless yow, sir, when I was a lad we couldna get our teeth into the bread, and when we got um in, we couldna get um out. And there were plenty of strong men then ; there are no strong men now.' And if this has to be said of the people of the village, what can we say of those of the town? They are infinitely worse. The wail in the papers, because of the decline in the physique, is often long and loud. When I look round and see the sort of young men that are to make the nation of the future, I say it is a question of 'God help England.'

And what of the diseases that multiply so fast around and about us? The like, in my opinion, never obtained before ; diseases multiply apace. We can scarcely go into a house and find health obtaining all round. We hear it said frequently that certain diseases have been 'stamped out.' Was ever any disease stamped out? What does the expression mean? That we have power to arrest disease? Where, when, and how do we exercise it? If we had power to arrest disease, we should, of course, permit none amongst us. We have no such power. Diseases multiply in spite of us. Our efforts are labour in vain. These facts, and more of the same kind, are the things that *experience teaches us.*

CHAPTER VI

SANITATION

SANITATION, as we ought to understand it, should be first a *Science*, and then an *Art*. It should be a science, inasmuch as it should embrace a knowledge of the aim and object of its work. It should be an art, because it actually accomplishes its purpose. Is sanitation such a science? Are its aims and objects accurately known? And does it cover in every particular the plan it lays down? These are important and suggestive questions.

We may admit, freely and cheerfully admit, that the work done is admirable. Dr. Leal points with pride to the 'impressive' works done in America by the sanitary engineers. He describes them 'as surprising for their vastness and importance.' We acknowledge all this, and also that, among their engineering and other scientific monuments of human skill, there are none much greater than those of the sanitary experts. There is no fault in the art—in the work. This is true also of our own country. When it comes to the question of the conception and execution of an idea in art, we English are not so much behind our American cousins. We may claim, too, that when it comes to a question of relative excellence, we are not so very far behind in this matter. The work our sanitary engineers do deserves all praise. There is no exaggeration here. It is not the *work* that is at fault. It could not be better. This, however, is not all we want.

We ask what is it to sanitate? What is sanitation? Sanitation is, or ought to be, *the science and art of producing health.* To sanitate is to understand the science, and practise the art, of sanitation—to promote health, in short. Has sanitation accomplished its purpose? Many answers will be given to this question, and these answers will vary according to the standpoint of the respondent. The sanitarians—the adepts as they think—will say there is no doubt at all in the matter. They will, indeed, be astonished that any one should ask such a question. Look—they will say, as they point with pride to their work—at the results. Are not things, in this respect, ten thousand times better than they were in the days of our forefathers? They think, as they make this and similar remarks, that they shatter with one fell swoop all our doubts and fears to atoms. But have they just cause for all their boasting? Is it not somewhat vain?

We do not say, for I suppose we *may* not say, that they have not made things more comfortable. That, however, is *nihil ad rem.* Our anxiety is not so much about comfort as about *health.* An armchair is, no doubt, more comfortable than a wooden stool. But which better promotes health? I remember the time when people did not care to sit in an easy-chair, and if they did, they sat upright and made no use of the back. I often say that the back of a chair, like the saucer for the teacup, is made to hand it about. It was not made for lolling. Are those ladies and gentlemen who loll any the better for it? We know that they are worse. It would not be an evil day for England if all the armchairs, sofas, furs, *et hoc genus omne*, were made into a bonfire. Comfort and health are not synonymous terms. The one does not involve or imply the other. And it does not follow that the thing which promotes the one forwards the other. We should be hardier and better in every way if we had not so many comforts.

But sanitation has not fulfilled its purpose by simply making things more comfortable. This is perfectly true. We must not admit that this is its object. Its aim is higher and holier. It ought to be, and is, when properly understood, the *Ars Artium*. It should constitute, and ought to constitute, the basis of our morality. It should cover and embrace all those principles, as far as they can be conceived, which underlie health. Now my charge, and it is a serious one, against the art of sanitation, as it is practised to-day, is not that it is utterly useless, but that it scarcely touches the question of health at all. This is the charge. My point is clear and definite. I know whereof I affirm. I hope, before we have done with the subject, to justify my position. '*Nullus esse potest ambigendi locus.*' My task is a big one; but I hope not an impossible one.

CHAPTER VII

DISEASE

We have seen that sanitation is the science and art of promoting health. We ask next, Whither does the art direct its aims? It has an object; what is it? The answer to this question is an easy and a ready one—DISEASE. It seeks to remove, or otherwise to prevent, disease.

Is this right? There is a maxim entertained by some politicians, 'If you would have peace, be prepared for war.' This maxim, on the face of it, justifies itself. The enemy is not so likely to attack when there is no part or side of the defence vulnerable. If the forces are overwhelming, 'prudence' is found to be 'the better part of valour.' It is exactly so here,—*Maintain health, and disease has no place.* These things are as obvious as they are easy to state.

It follows, therefore, that the aim of sanitation is wrong. We need not say, because it is obvious, that if the principle at work be not right, the result will be fruitless. This position of matters is exactly the one that obtains. ''Tis a pity 'tis true,' aye, and ''Tis true 'tis a pity.' We shall discuss the question of disease.

What is disease? A prior question is, What is life? This question, like many another, we cannot answer. We only know what life is by some of its manifestations. What is disease? is a question equally unanswerable. The answer to one question is the answer, in a way, to the other. We do not know either what life is, or what disease is. Disease is that thing which makes life more or less miserable. An old writer says, '*Non est vivere, sed valere, vita.*' And *valere* is to be without disease.

The parts of the word disease are *dis* and *ease*. The latter is the root, and its meaning we know. The prefix *dis* properly signifies *in all directions*. The prefix, therefore, disperses the thing contained in the root. A *disease* drives away the *ease*. It is a discomforting and mischievous agent. It is one that deranges some one or more parts of the system.

Is this agent one or more? There are those who multiply the agents almost indefinitely. As the system consists of many parts, and as any one of these parts might be deranged, there are, if not a multitude of agents, at least a multitude of diseases.

The names of human diseases are legion. These names are often perplexing and confusing. This arises from two causes. (1) Their derivation. The words are generally made up of Greek terms. (2) Their want of precision. They do not describe accurately the thing with which they deal.

We may take as an illustration the King's recent illness. The name by which the disease was described in the papers was *Perityphlitis*. This is a Greek compound, and its parts are *peri* and *tuphlos*. These parts mean *about* and *blind*. What notion do these words convey? What really was this disease?

An abscess—a congealed issue. Where? On the cæcum or appendix, which is an attachment to the ascending colon, whose purpose in the system is very little understood. If it had been something *inside* the appendix, it would have been called *Appendicitis.* The operation consisted in removing the abscess from the attachment or appendix. The names *Perityphlitis* and *Appendicitis* convey no meaning whatever to the ordinary mind. Abscess is an intelligible word, and conveys some meaning. Why not use this? If the King's illness had been described as 'internal abscess,' the ordinary mind would have had no difficulty with it.

We might illustrate this kind of thing to an almost indefinite length. It would not be very profitable, and so we will content ourselves with one other illustration—*Laryngitis.* This word is used to describe a disease of the *Larynx*, or voice-box—*the Adam's apple* in the throat. *Laryngitis* simply means that something is wrong with it. It does not suggest what. Now many things may be wrong with the *voice-box.* The vocal cords, for instance, may fail to approximate, and this for many reasons. There are many things else that may be out of order in it. When, however, the word *Laryngitis* is used by the faculty, the voice-box is generally *displaced.* It is then a question, not of medicaments at all, but simply of *replacing.* But why use Greek derivatives when English words will do? And why not use a name which conveys some meaning? It would be well for us in these matters to speak English, and to describe things in a language 'that may be understanded of the people.'

We next ask, What is the *cause* of disease? The question had better not take this shape. We should rather ask, What are the *causes* of diseases? Diseases are many. The causes are many. What are they—these causes? I have an answer to this question, and I think it is the true one; but I will not give it here. We will now examine the alleged causes. We will give them in something of their historical order.

1. *Demons.*—The other day a lady asked me, 'What is devil-possession? The Saviour cast out seven devils from Mary Magdalene! What were they?' I could not answer her question satisfactorily. It is evident that possession by demons was supposed to obtain in the Saviour's time, as nowadays it does among savage tribes. It may be that the use of the expressions was by way of accommodation. The cases were such as might be put down to demon-possession. What we know as epilepsy, hysteria, and lunacy were ascribed to this cause.

I have given elsewhere an account of a case of epilepsy with which I was enabled to deal successfully. I found that the humours from the liver were affecting the nerves of the brain, and that a cure was simply a question of diet. I took care that the lad ate nothing but 'Natural Food,' and the lad got well. Epilepsy, in that case, was certainly not demon-possession.

This stupid opinion used to be very prevalent in England. Some of us are old enough to remember the time when exorcism was practised, and all sorts of things were done to counteract the machinations of witches and wizards. These ideas are still very prevalent among uncivilised peoples. All sorts of illnesses are ascribed to the *spirits*. They have, therefore, their '*witch-doctors*.' There are some parts of

England to-day, and many parts of Scotland, where these ideas are still entertained. Of course the authorities say, '*Nous avons changé tout cela.*' And it is certainly time that healthier opinions should obtain.

2. *Heredity.*—This generally resolves itself into a disposition to take on the same diseases as troubled the parents. We need only say that, as we are born of parents, we shall generally bear the same characteristics, and, under the same conditions, we shall be liable to the same consequences. A man, for instance, born of drunken parents, will probably inherit the disposition to drink, and, if he indulge the propensity, will become drunken too. *Sanitation*, as it is now practised, can no more touch *this* than it can touch demon-possession.

3. *Germs.*—This is a modern idea. We have seen that it is the one entertained by Dr. Leal. There are many who entertain it. We need only observe that a germ assumes a seed. The two are inseparable. The one cannot be transferred without the other. The germ implies that the seed is already in fruitful soil. The difficulty of transference to another soil, and growing and prospering there, is greater than we can get over. How can it be transferred? How can it grow in a new, and altogether different soil? We must answer these questions before we can say what will be the effect of sanitation on the germ.

4. *Microbes.*—The discussion of microbes involves so much that we must devote a whole chapter to its consideration. We will only say here, that the word is the newest modern one. I have searched in the lexicons and dictionaries in vain for it. It is not to be found. The word does not exist among us yet

with any meaning definite enough to permit of definition.

5. *Putrefaction.*—This is not only harmful as producing microbes, but also in itself. A separate chapter is given to the consideration of this source of disease.

6. *Smells.*—This point is so large that we must deal with it under a distinct title.

7. *Bad Water.*—This is a fruitful subject. It also must receive separate treatment.

8. *Impure air.*—As air is one of the factors of life, we cannot dismiss it in few words. It must have a chapter to itself.

9. *Contagion.*—This also must be reserved for separate treatment.

We are dealing, as it may be clearly seen, first with things as they are. We may have something to say by and by about the way things ought to be. We shall be better able to accept the true, when we have seen what is not true. '*Ist dir wohl so bleibe.*' Yes, and if it were a case of being well, I should be the last to speak. It is precisely because the opposite obtains that I lift up my voice and cry. The appearances, however, are so prepossessing. They are everything that we could wish. We must not trust appearances too implicitly. Cicero says, '*Ita finitima sunt falsa veris ut in præcipitem locum non debeat se sapiens committere.*' A wise man will investigate. He will not accept *conclusions* if the *premises* are but opinions, and are only advanced by the *ipse dixit* of a person in authority. Truth is axiomatic and self-evident. No wise man will refuse what is true. Every wise and prudent man will think before accepting the false, '*Ita lex scripta est.*'

CHAPTER VIII

PUTREFACTION

THE putrid is the *bête noire* of the sanitarian. Perhaps it would be more correct to say, it is the *bonne bouche.* That which determines whether it shall be the one or the other, is the aspect from which we regard it. It was only the other day I saw the Medical Officer of Health, rubbing his hands, as if with glee, at what others would have regarded as little short of a calamity. Anyway, it is the putrid, or that which contains the putrid, that gives occasion for most of the sanitarian's work. And so we ask, What is putrid? What is putrefaction? We are now on the borderland of a very large sphere—one that is too large for us to explore satisfactorily. There is a Latin proverb, '*Cito maturum, cito putridum*' (Soon ripe, soon putrid). This helps us not only to conceive a truth, but also to generalise. The truth is, that putrefaction follows sharp on maturity. The generalisation is, that putrefaction is the lot of all living things.

There are, however, two states or kinds of putrefaction. Living things throw off parts of themselves during their progress towards maturity, as the trees, plants, and flowers do their leaves. *These all putrefy.* The trees, plants, and flowers, in their turn, mature, die, and putrefy. There is something of this kind going on among the animals. It is a matter of general observation, and we need not specify. And so it follows that there are, broadly speaking, two kinds of putrefaction. Putrefaction is a thing in Nature which is constantly going on. 'Change and decay in all around I see.'

What follows from this? There is a constant round of life, putrefaction, life. Round and round it goes. There is no standing still in Nature. From the putrefaction of vegetation there is a constant production of gnats, mosquitoes, flies *et hoc genus omne.* From the corruption, or better, putrefaction, of animals there are lice, ticks, and other vermin. From meat, as it putrefies, there are maggots and then grubs. The philosophers have a dictum, *Ex nihilo nil fit* (From nothing nothing comes). We ought to be able to conclude, if this dictum be true, that *life only comes from life.* Is that true?

We must always express ourselves very carefully, especially when our ideas are new. The dictum of the philosophers is only true in a certain sense. Here is an egg. It is not alive. There is, however, life in it. How is the life to come out of it? This is a point that may not have occurred to us. We may not say the egg is putrid matter. We may say, however, that it will soon become so. What is it? We cannot answer the question. We know but a few things about it. We think it is food, for instance, and so we eat it. Is it food? Who doubts it? We may think and say what we like, but Nature certainly intended it for quite another purpose. That other purpose is brought about pretty much in the same way as life is produced from putrefaction. *Heat does it.* It is even so. The meat would produce no maggots if it were frozen.

It is not true that 'life comes only from life.' It is generated by heat and moisture in flesh. It is generated in the seed in the same way. All vegetable life, or nearly all, is generated in this way. It is not true, we repeat, that life comes only from life, unless we affirm that insects and vegetation possess no life. It is not true, perhaps, that all life comes of putrefaction. It is true, perfectly true, that a great deal of life does originate in putrefaction.

If we will drive this idea further home, and find for it a permanent *habitat* in our minds, we may do it in this way. A butcher told me he once blew a bladder. He did it of course before there had been any time for putrefaction to set in. He then hung it up in the kitchen to dry. Of course the kitchen would be always warm. The heat set the flesh on the bladder to putrefy and generate. In the course of time an immense blue-fly was singing inside. How did it get there? It could only get there on the supposition that what we have been saying is true. The light and heat generated the maggot, and the light and heat caused the development of the maggot into a blue-fly.

We have something analogous to this in the development of the caterpillar into a butterfly. The caterpillar comes from an egg. The order of the process is egg, caterpillar, butterfly.

All this is as curious as it is interesting. But it upsets many of our theories—theories which we have held and cherished very long. We do not like to let go our pet ideas. And yet why not? It is not wise to hold notions for no better reason than this—they are old. The theory of the solar system is new. Where should we be to-day if we had refused to believe it? The same conditions obtain with many things else.

Does the blue-fly again lay eggs? My notion is distinctly that it does not. Why? Well, if it did we should be driven out of our houses—they would propagate so rapidly. Then, again, there are no blue-flies in winter. At least, they are only to be seen in exceptionally warm weather. And yet the squire's game and venison generate maggots! How is this?

We may ask again, how is it that the manure-heap generates grubs? It must be so, for there are none in the manure when it is put there. We may fence with the question, Do these things propagate themselves? but there is no doubt to my mind as to their origin. *Putrefaction produces life. Putrefaction does not produce death.* We are surprised at the thought, and do not know what to do with it. But we must force it home.

The idea is as striking as it is new. Scripture says, 'There is nothing new under the sun.' But it must be meant that things were as they ever had been. It could not mean that our ideas are not new. True ideas—ideas of the real state of things—are constantly taking the place of the false. And so we are in a position to accept the dictum, '*Mais c'est du neuf, du tout neuf, qu'il faut créer.*' We have a task, a big one, before us, for the world is not prepared for new ideas of this kind. It says, and it believes, that the old are better. It sticks to the old, too, especially where money is involved. We have something here more precious than silver and gold—TRUTH. We are seeking for what we shall never find if we think that the panacea for all our woes is in removing the evils of putrefaction. No, it is not there. The discovery may be a misfortune to many, and yet it is better, '*Hoc sustinete, majus ne veniat malum.*'

We are considering a subject about which there is a great diversity of opinion. We have seen that putrefaction is the be-all and end-all of the sanitarian's efforts. He works on the principle that it causes disease.

We have not come across any evidence yet that he is right. We have seen that there are two sorts of putrefaction—the putrefaction of that which leaves the body and the putrefaction of the body itself. Both these produce life. We have not been able to answer the question, though we have tried, Does the life that comes from putrefaction again produce life? If we could answer this question we should be able perhaps to solve many mysteries. Let us remind ourselves of the illustration afforded us by the blue-fly in the bladder. It must have come from the maggot. Does it again lay eggs, which again produce maggots? I know what people say, but there is no proof that they are right. My notion is that it does not. It seems to me that all these things are the outcome of putrefaction.

At this point arises a very curious and interesting question, How does it come about that grubs are often found in cows and sheep? Are they generated by life? My answer to this question would be that facts are against the supposition. These things are taken in with the food and accidentally stop in their course in the throat or windpipe. They never, in my opinion, enter into the stomach. I cannot find the least evidence that they generate of themselves or that animals generate them. I have always been open and ready to receive and examine any evidence. I have invited it, but in vain. It seems to me that animals generate animals. Putrefaction generates grubs, maggots, &c. Vegetable putrefaction generates gnats, flies, &c. Animal putrefaction generates maggots, grubs, &c. This is a rough generalisation to which there are exceptions on both sides. We have an exemplification in the grubs in manure.

But what causes putrefaction? Does oxygen? Yes, in a way. It is easy to ask questions like this. It is not easy to answer. What is life? The eminent Dr. Virchow, as we have seen, said the last time he was in England, 'I have been a student of this question these fifty years, and I am as near a solution as when I started.' What is disease? We can only now say it is that which brings about death. What is putrefaction? That which follows on death. We do not know its cause. We cannot go any further than this. What now does experience tell us about the relation of putrefaction to life? We have seen that it generates it. Does it destroy it? *Experientia docet.* What does it say? The exact contrary. *Putrefaction neither destroys nor injures life.* What if it did? Life would be impossible. These are strong statements, but they are necessary to our case.

Now for illustrations—(1) The Zulu mother, travelling with her child on her back, and coming to a rotten sheep, will take out her knife, open the carcase, cut off a slice, and give a piece of it to the child to suck. (2) The German peasant farmers place their largest and best heaps of manure right under the windows of their best rooms. (3) If a rotten sheep and a fresh leg of mutton be thrown into the yard, and two dogs—a well-bred spaniel and a cur—be turned into it, the spaniel will make for the carcase, while the cur will go to the fresh mutton. (4) The squire eats his game and venison high, while Hodge will not touch it. (5) The dogs in Jerusalem, Constantinople, and other Eastern cities, are the only scavengers. They eat up all the putrid matter. (6) Ducks, geese, and fowls generally, live very much on putrid matter. The duck is never so happy as when in a filthy pond. (7) The pig passes nearly the whole of his existence in filth. And some of us like nothing so much as bacon for breakfast. (8) The Parsee exposes his dead relative to be eaten by the vultures. (9) We put all the putrid matter that we can possibly collect into the manure heap and then lay it on our gardens and fields that it may become a source of life to all that we want to grow. (10) The grass in our churchyards, fed as it is by the bodies underneath the surface, passes into the flesh of the sheep who graze on it, and whose carcases we eat.

The argument is as cumulative as any argument can be. It is no question indeed of *poco poco*, but rather of *multo multo*. How, then, does it come about that all our anxiety is to relieve ourselves of the putrid? 'Let us get the filth out of the way!' By all means. Why not? Perhaps it is here that the idea originates, 'Everything in its proper place.'

Exactly so. The proper place for the putrid is the manure heap. The more manure heaps the better, for they constitute the wealth of the land. One of Lord Beaconsfield's mottoes was *Sanitus Sanitatum*. We may make it ours; but we shall only carry it out, so far as the putrid is concerned, by making it subservient to Nature's wants.

It is somewhat interesting—I was about using a stronger term—to notice the lengths to which the authorities go in condemning what is putrid. It makes one ask, Do these people ever think? And yet they are for the most part intellectual men. They can see deep. It would seem at times, indeed, that their eyes can see through anything, no matter how opaque. And yet they have not seen *these things*. The following, taken from one of our recent dailies, illustrates and emphasises this point:

'There is a mild epidemic of typhoid fever at present in New York. Chicago has been more severely visited with it, and other large towns are also sufferers.

'The prevalence of the disease has caused some exhaustive study by bacteriologists, and something like a revolution in the theory regarding the origin of typhoid has resulted. The chief source of evil is not the water supply; nor is it the milk.

'The water and the milk were proved by analysis to be above suspicion in quarters where the malady was raging with particular violence. It was then discovered that most of the typhoid was coming from the soil.

'The origin of the trouble in most cases has been traced to the eating of raw vegetables, lettuce, tomatoes, onions, &c. These vegetables came mostly from a part of the country which had been partly submerged by the heavy rains of the present summer. Contamination had been spread from the barnyards, where no sanitary precautions are taken.

'The Board of Health now counsels the public: 'Do not eat raw and unclean vegetables; do not buy cheap dairy products; sterilise the milk." Cooked vegetables, it seems, are all right.'

Notice first that typhoid obtains in New York, Chicago, and other large towns. It is so severe that it has taxed the powers of the bacteriologists to the utmost. The cause was neither water nor milk. The cause was putrid matter on the vegetables.

It does not occur to the thinking mind, either editorial or bacteriological, that the cause is twofold: (1) bacteria, and (2) putrid matter. Which is it? Why have they not discovered the bacteria? It does not occur either to ask how *all* the vegetables could be thus filthy. The towns affected are miles and miles apart. How could the same cause obtain in every place? These questions are puzzling. There is no doubt, and can be no doubt, to the thinking mind, that the cause of typhoid was not *ab extra*, but *ab intra.* It is a case, indeed, where Sir W. Collins's advice would come in opportunely—'Study the *man*, not the *microbe.* Healthy blood is fatal to the microbe.'

We have seen from many things that disease is *not caused by putrefaction.* We notice a case in point. When I was, many years ago, staying in Freiburg in Breisgau, I met with a German friend and went out frequently for a walk with him. This man would often *eat rotten pears.* I would sometimes venture to remonstrate with him; but I invariably received the same answer, 'Pears are not fit to eat until they are rotten.' In the end I became fond of them myself. How is this?

We eat rotten cheese. Some people like it best—the more decayed it is the more they relish it. How is this? If putrid matter cause disease, then why do people prefer it?

We must go a step further. What about our wines? Are they not all produced from rotten grapes? What again about the cider? Is it not produced from rotten apples? It is clear, then, that putrefaction does not cause disease, directly or indirectly. There is no gainsaying these facts. They are, as Shakespeare would put it, 'open, plain, palpable.' Putrefaction supports life, generates life. It does not destroy it. Is it not impossible that the same thing may have opposite tendencies? Experience says 'Yes,' emphatically.

Our point then is made. The facts are clear. The argument is conclusive. Putrefaction, far from being a cause of disease and death, promotes and supports life.

CHAPTER IX

MICROBES

THERE is an intimate connection between this subject and the preceding one. The consideration of the one is almost the consideration of the other. But I have thought it wiser to give a distinct chapter to the microbe question. The 'microbe' is now supposed to be the cause of nearly all our diseases. It was not so formerly. How did our forefathers deal with diseases, for they had not so much as heard whether there were any microbes?

What is the meaning of the term 'microbes'? It is very difficult to say. The root, I suppose, is *μικρος*, and means 'little'; but what is it that is little? I cannot find the word, though I have searched for it in many dictionaries.[1] It looks as if the lexicographers did not know what meaning to attach to it, and so thought it better to let it alone. It is a wise thing not to *say*, if you do not *know*.

The theory of the microbe, and its mischievous machinations, is quite new. I have fought the theory from the time of its inception. It may be twenty or thirty years old, but it is certainly not older than that. It was an idea that was tentatively and unostentatiously set forth at first, but no one opposed it. Does any one ever oppose a new scientific idea? It is not the way of men of science to do so. The microbe theory soon gained an easy foothold. It could stand, then walk, and then permeate and spread. And now it is everywhere. The microbe to-day meets us at every turn.

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[1] Since writing, I have learnt that it is found in some very modern ones.

It is not a bogey-man wherewith to frighten children, but a mischievous little imp to worry and tease men. We are constantly being warned of his evil doings. The microbe may be in our newspapers and letters, and it is positively dangerous to lay them on the breakfast table. This is said on the authority of the *Lancet*. We must be careful of sputum, for that is a fruitful source of microbe. Laws are enacted in America, and bye-laws are made in order to restrain it, in some towns in England. It seems to me that a far better plan would be to teach people not to spit at all. But how can this be done? Animals do not spit. Why? Because they eat natural food. Men would not spit if they did the same. But how can 'sputum' contain microbes? There has been a long discussion in the American papers about the individual cup at Holy Communion. A little has been said at home on the same subject. It has been thought the microbe may get on the chalice. This idea would probably not work with us, as so many persons go to the 'communion.' It would mean a large number of cups. Then the *Lancet* has recommended individual Testaments for 'kissing the book,' when taking oaths in court. The recommendation is scarcely less ridiculous than the custom. The oath is supposed to bind the witness to 'speak the truth.' It might have done this years ago. It has no such effect now; for kissing the book is no longer regarded as a religious act. It is treated as a merely perfunctory one, both by him who administers and by him who takes the oath. The microbe is on the *pencil* in the telegraph office. We are solemnly warned not to put it into our mouths. Putting the pencil in the mouth is never necessary, and it is certainly not a pretty action. These grounds too should suffice to make us leave off the habit. The microbe may also be found in *dust.* Let me here quote from one of the 'dailies :—

'At the Congress of the Sanitary Institute at Manchester yesterday Sir James Crichton Browne delivered an address devoted to sanitary science and preventive medicine on "The Dust Problem." Scientific men were as yet unable, he said, to determine how far the dust from the eruptions of Mont Pelée and La Soufrière had travelled, but probably it had reached an immense distance and might be reinforcing the black vomit from the chimneys of Manchester. Besides volcanoes, meteorites, and the surface of the earth, human agency was a dust-producing source. Particles of dust in the air increased enormously as the centres of human habitation were approached. In the wilds of Argyllshire air had been tested having 200 particles per cubic centimetre; in London they numbered 150,000 and in Paris 210,000. Dust assisted in the production of a low state of health and constitutional debility, especially among children, and, when floating in fog, it conduced to a widespread mortality. The pernicious effects of industrial dust were well marked and indisputable. They were removable and preventable, and efforts in these directions had already been rewarded with conspicuous benefit. Nevertheless industrial dust was still responsible for an appalling amount of suffering, disablement, and death. Generally speaking, the one universal and potent remedy was ventilation. Wide and airy streets and open spaces must be provided, back-to-back dwellings should be prohibited, and the height of all buildings restricted.'

The speaker does not here say that microbes are the cause of the danger. Is it a safe inference that his thoughts are running on it? Whether this be so or not, it is quite true that it is on this ground that the removal of dust plays such an important part in sanitary matters. Scientific men have associated small-pox with the 'aurora borealis.' There is no doubt it had as much to do with it as the dust from Mont Pelée has had to do with disease. Dust, of course, is unpleasant; but Nature has provided herself with a protection of her own. The doctor would have done wisely if he had called attention to this. What is the protector? The lining of hairs that every man finds in his nostrils. The physiologist will tell us that every hair is a scavenger, and one that knows his business. These hairs do not admit the dust into the lungs, but sweep it back on its approach. Breathe through the nostrils therefore, and you will not breathe dust into your lungs. The microbe is found also in dirty vegetables, in smells, in bad air, in fowls, in milk, and in short in almost everything. We live as it would seem in an atmosphere impregnated with microbes, and can scarcely touch anything that is not full of them.

Microbes are divided into two classes—pathogenic and harmless. Pathogenic means disease-producing. A pathogenic microbe, therefore, is one that produces disease. The harmless ones hurt nothing. The pathogenic are specially mischievous. It would be difficult indeed to say what disease they do not produce.

This ought to mean that there are many *kinds* of microbes; but this is never distinctly stated. I suppose this arises from the fact that it is impossible to differentiate them at all. The bacteriologist can neither tell their size, shape, or colour. He does not know which is harmless, and he cannot tell why they are pathogenic or otherwise. And yet all this ought to be easily possible. Argue in this way: There are many kinds of microbes. What makes them differ? We do not know. How is it there are many kinds? Because they produce different diseases. There are these kinds certainly—cancer, small-pox, influenza, typhoid, tuberculosis, colds, enteric, and diphtheria. Is there a microbe, then, for each disease? Who knows?

There was an appeal in the papers a little while ago for £100,000 to aid in the search for the cancer microbe. The Duke of Bedford offered £1,000 a year for three years to help on the fund. His Majesty the King takes a great interest in it. I do not know how long the inquiries have been going on; but I search the papers daily, and I have not yet been able to discover that any tangible result has followed from any of the labours. We shall know as soon as they succeed. These things are soon blazoned abroad, sometimes rather prematurely. The following letter will illustrate. The writer is somewhat rough on the medical authorities. This is not always wise. I give the letter without comment.

'SIR,

'The Middlesex Hospital has just issued a first volume of over two hundred pages of reports of their cancer researches.

'It chronicles the monumental failure of the present methods of investigation by way of experiments upon living animals, and of the "cytology" of the blood; and it enlarges the vocabulary of the English language in so startling a manner as to render all existent dictionaries obsolete. Enormous numbers of guinea-pigs and other animals have had tumours and other miseries inflicted upon them until they died, the necessary abomination being duly squirted into them under the legal sanction of the present law.

'But the results as regards any cure of cancer amount to nothing at all; and as to the "cytology" of the blood of cancer patients we read that "in no one case can any single examination be found to show any special characteristic that can be regarded as specific or of the slightest diagnostic value."

'The utter failure of these researches is, however, delivered to the world in a language that includes such terrific words as these: "Polymorphonuclear leucocytes," "easinophilis," "mononuclear cells," "myelocytes," "haemoglobin percentages," "normoblasts," "poikiloblasts," and "megaloblasts!"

'Is not this enough to make the compilers of dictionaries utter megaloblasts on their own account? I am sure the authorities at the Middlesex Hospital cannot look in each other's faces without laughing as they issue this absurd volume at the expense of the charitable. If they ever issue a second volume I invite them, in the name of antivivisectionists and of common sense, to quit this barren field of the megaloblasted sufferings of guinea-pigs and rabbits, and turn their august attention to such questions as whether the Registrar-General's recorded annual death-rate per million persons from cancer during the last sixty years synchronises with the habits or customs in a manner suggesting cause and effect.

'Does cancer increase contemporaneously with the enforcement of compulsory vaccination? Or with the increased consumption of tobacco or cigarettes? Or with the increased consumption of meat, or certain kinds of meat, of salt, or beer? Has it markedly increased since anti-toxic serums have been inserted into people for diphtheria, typhoid, &c. Such investigations undertaken without bias might lead to some tangible results, and they would not involve megaloblasted language.'

The following article will show that there is abundant reason for finding this cancer microbe, if only it were possible to do so—

'A writer in *The Medical Magazine* dealing with the causes of the deaths among the assured in the Scottish Widows' Fund, draws attention to the remarkable increase—exhibited in the statistics of the company—of mortality from cancer.

'From 1861 to 1870 the mortality of all ages among 10,000 males was 2·42; from 1871 to 1880, 3·12; and from 1881 to 1890, 4·30.

'Thus the rate of mortality for all ages was nearly twice as great from 1881 to 1890 as it was from 1861 to 1870.

'Two points of interest are apparent from these tables: (1) That, as measured by the total deaths from all causes, there has been a very considerable increase in the mortality from cancer among our members during the twenty-one years. It is worthy of note that the actual number of deaths from 1888 to 1894 was more than double that from 1874 to 1890; (2) that there was a very serious decrease in the average age at death from 1874–80 to 1881–87, and a very slight recovery in age from 1881–87 to 1888–94. This is contrary to the experience of the company for death from all causes, the average age at death for the total mortality in each septennium being 57·083, 58·105, and 59·192 years respectively.

'For the twenty-one years (1874 to 1894), from group fifty-five to sixty-five upward, the death-rate of the Scottish Widows was very considerably higher than that for England from 1881 to 1890.

'The following conclusions are reached by the writer—

'1. The registered increase in the number of deaths from cancer is undoubted. This is proved by the statistics of the Scottish Widows' Fund, and corroborated by all other authorities.

'2. After allowing that this increase is not wholly real, but may be accounted for, to some extent, on the assumption that the true nature of obscure cases of malignant disease has been recognised with ever-increasing certainty in recent years, and that, as a consequence, the statement of death has been made with greater precision than had been formerly the case, there remains a large real increase to account for the large and progressive mortality from this disease.

'3. The age period at which death from cancer is most frequent is gradually declining, according to the Scottish Widows' Fund returns.

'4. The average age at death from cancer among its members declined by two years in the two decades from 1874 to 1894, as contrasted with a rise in the average age at death, from all causes, of a little over two years.

'5. The office returns mark a decrease in death from internal cancer of 7·70 per cent., and an increase in deaths from external cancer of 18·89 per cent. of the percentages in the first septennium as contrasted with the third.

'The most salient point in these statistics is the demonstration of the fact that cancer as a cause of death between the ages of forty-five to sixty-five has made rapid and startling progress.—*Medical Record.*'

This letter shows that we are just as near, or as far, from finding the cancer-microbe as we ever were.

I give next a short article from another daily, under the heading of 'Sanitary Experts.' It deals presumably with the search after the enteric microbe. Effort was made to kill it by inoculation :—

'Of the various papers read at the Sanitary Institute Congress Sectional Sittings, at Manchester, yesterday, that by Dr. Childs, D.P.H., on "Enteric among Armies in the Field," created the greatest interest.

'Convinced that much sickness and death among the troops in South Africa might have been prevented by a complete system of sanitation, the author had endeavoured to impress upon the medical profession that possibility.

'The age of soldiers predisposed them especially to enteric, but they suffered comparatively little from it in the absence of insanitary conditions. The average enteric mortality for troops in the United Kingdom was considerably lower than among civilians of the same age.

'After the report of the United States Commission appointed during the war against Spain the mortality in the war fell rapidly, and in the last six months was remarkably low. Had a sanitary commission been appointed at the outset, preventative measures would have been enforced, and many thousands of lives would have been saved.

'A resolution was passed urging that means be taken to facilitate the study of the United States Commission's report on military camps in the Spanish war, and to ascertain what measures the War Office is taking to organise a complete system of sanitary organisation in the British army.

'The President (Sir James Crichton Browne), in putting the resolution, said that the expenditure by the Government of one million sterling in a thorough investigation of typhoid would ensure a gigantic saving in future military operations.

> 'These matters could not be satisfactorily dealt with until we had as Minister of Public Health a member of the Cabinet.'

The point illustrated by this article is the fact that they are not yet on the track even of the enteric microbe.

Now what about 'Tuberculosis'? Let the following speak for itself—

> 'When the people of all civilised countries unite in a campaign against tuberculosis it is not only because the fight against this epidemic is the greatest and most important of all the problems which modern science of medicine must try to work out, but also because we have more and more come to the conviction that the struggle is not hopeless. It cannot any longer be considered fancy when we express the hope that tuberculosis will become a very rare disease some day or other. However, we shall not be able to attain this object without making earnest use of all the means which the science of medicine has placed at our disposal. Among these means the prophylactical measures deserves doubtless to be placed in the front rank, and we must especially emphasise that there is a particular effective prophylactic, since we cure the patient suffering from tuberculosis by means of physical methods, and in this manner arrest a frequently very effective infectious source. In this way the humane regard to each individual sufferer is united with the welfare of society in a very happy manner.
>
> 'When I received the honourable invitation to express my opinion about the campaign against tuberculosis I was very highly pleased to do so, because I think that our times can hardly aim at anything better and greater than the extermination of this dreadful scourge of humanity. However, this

is a small domain of tuberculosis which I have been particularly taken up with, and of which I therefore, as a matter of course, should like to say a few words. This domain is tuberculosis of the skin, particularly lupus vulgaris.

'In the light treatment—that is to say, the treatment with exceedingly strong concentrated rays of light—we have a method which is able to cure this disease in most cases. My experiences, which embrace more than six years and more than eight hundred cases of lupus vulgaris, have taught me that nearly all cases, even the severest, are favourably influenced, because only about two per cent. of our cases have not been influenced.

'The treatment can work wonderfully quick in small and young cases, but, on the other hand, it may be of a very long duration in old extensive cases. The definitive cure is in many cases made uncertain by the sufferings of the mucous membrane of the nose and mouth, which cannot be treated by light, and from which the disease is able to spread again.

'As particular circumstances of the light treatment I must emphasise its painlessness and the good cosmetic results.

'As to Denmark, it is not far from all other cases of lupus being exterminated. At any rate, the increase of patients from Denmark to the light institute had already culminated a few years ago. The method is now introduced in many places outside of Denmark; in Berlin, Paris, London, Saint Petersburg, Vienna, and in many other towns there have been erected university light institutes or special wards for the treatment of lupus in the large hospitals, the increase of patients being everywhere very great, in most places even greater than they have been able to manage.

'What I have told here of the cure of lupus cannot claim the interest, and is not so important to humanity as if it turned upon phthisis itself; but we must not undervalue the importance to each individual person who is suffering from this dreadful disease, and as a line in the campaign against tuberculosis it may be of some interest to the congress.—NILES R. FINSEN, M.D.'

This article illustrates several points. As they are very important in enforcing our contention, they may be dealt with in their order.

1. *The prevalence of Tuberculosis—consumption—in civilised countries.*—This disease seems to show no sign of decrease. Whether it exists in uncivilised countries, I cannot say positively. The presumptive evidence is certainly against it. The savage races take on our diseases only when they take on our habits of living. These habits, indeed, soon exterminate the savage races; and this fact speaks volumes.

2. *Its nature is mistaken.*—It is here described as epidemic. What does the writer mean? The roots of the word are επι and δημος. These mean "upon" and "people." The word implies that the disease is *ab extra*—comes from external sources. It is used when many persons have the same disease. In this sense tuberculosis, as experience teaches, is not epidemic. If the writer means that it is not without its influence, he is right. But the same thing is true of every disease. We may regard it indeed as a maxim —*Health conduces to health, sickness conduces to sickness.*

3. *No hope of lessening.*—This is perfectly true. Present methods have so far done absolutely nothing. *The microbe has not been found.* Koch, some twelve years ago, thought he had discovered the means of stamping it out; but things are as they were—only worse. The article gives no reliable evidence that

lupus has been, or is likely to be, in the least degree lessened. The cases have been favourably influenced, but have they been *cured?*

4. *The writer confuses Tuberculosis with Lupus.* The two things are not the same thing. The cause may be the same; that, however, is another question. We need not here discuss it, for it is not against the cause that the efforts were made. The *light* can only touch the *effects.* Consumption implies that the lungs are slowly burning away. Lupus is a wasting of the skin. Its secondary cause is an *issue.* This issue is not a deposit, as of a microbe, from without. Its cause is internal. There is no comparison between the two things. The writer supposes a microbe—the same microbe—causes both diseases; but he has not proved his point. If he did, or could, we should ask, How is it that the microbe finds his habitat in the one case on the skin, and in the other case on the lungs? We should have no difficulty in refuting the whole theory, because we should say, what common sense would suggest, that the microbe would be taken from the face by washing. A microbe on the skin is impossible!

5. *The upshot.*—We are unfortunately obliged to say that the doctor's testimony affords us no comfort. It only illustrates the point towards which we are tending, viz., that the microbe is *imaginary.* It has no existence. We cannot but hope that the *theory*, like its many predecessors, will soon die a natural death.

The following is a marvellous production, and still further shows how deep-rooted is the notion that there is such a thing as a tuberculosis microbe. It is worth our while to examine it, because on the surface it looks so plausible.

'TUBERCLE BACILLI IN THE NAIL DIRT OF CHILDREN.

'Kornel Preisich and Aladar Schütz report the examination of the nail dirt of sixty-six children, with a view to demonstrating the presence of tubercle bacilli therein. This was successfully done in fourteen cases, or 21·2 per cent. The children were taken promiscuously without respect to their living in tuberculous surroundings. Of the fourteen cases in which tubercle bacilli were found nine gave an hereditary history of tuberculosis. In all cases in which an hereditary history of bone tuberculosis was present bacilli were found. The method used in demonstrating the presence of tubercle bacilli was usually that of the stained preparations. At first animal inoculation was tried, but it was found that very frequently the animal quickly died of some acute infection. This work demonstrates the importance of the nail dirt of children in the spread of tuberculosis' (*Berliner Klinische Wochenschrift*).

We notice the following points :—

1. *The notion that tubercle could get in the Nail Dirt at all.*—How was the idea suggested? We need not think this strange, for it is all on a par with much that we have dealt with already. It may just as easily be *there* as on the point of a pencil. It is a further illustration that the searchers after the microbe intend to leave no "stone unturned."

2. *The successful finding of the microbe in so many cases*—21·2 per cent.—Now how did it come to be found in some cases and not in all? This question is not so simple as it looks. The conditions of the dirt would be the same in every case. We know what these conditions are, and need not describe or discuss them. The logic of these conditions is that

bacilli in one case meant bacilli in all. This is quite clear, explain it as they may.

3. *Nine gave an hereditary history of tuberculosis.*—The inference from this is, that the *tendency* was the cause of the presence of the bacilli. But surely if the microbe was already at work, he would be in the lungs, how came he to be under the finger-nails? Had he gone there of himself, to find a hiding-place? Then, if this account for the *nine*, what accounts for the *five?* The statements are illogical.

4. *In all cases of bone tuberculosis bacilli were found.*—One would suppose the proper *habitat* of these bacilli would have been the bone. How, then, did they get under the nail? But why in this case were they not able to distinguish microbe from microbe.

5. *What are the stained preparations?*—We have no means of understanding what this can mean.

6. *Why inoculate?*—How was it done? Did they inoculate with the nail dirt? And are we to understand that the animals died from it? Such things should surely be told 'to the horse-marines.'

7. *This nail dirt can spread tuberculosis!*—The wonder is, then, that more children are not consumptive, for they generally have dirty nails enough.

The examination of these things, though it takes time, is most important to our work. A correspondent said the other day, 'If you have discovered the *genesis* of the microbe you have the eternal gratitude of the human race hanging over your head.' I am quite aware of this, and it affords the reason why I am working so assiduously.

We should not exhaust all the material at our command if we worked from now until Doomsday. We must content ourselves, therefore, with examples—

specimens, so to speak—of what is going on. The following needs examination :—

'The North Staffordshire coroner concluded his inquiry at Uttoxeter yesterday into the death of Joseph Swinson, aged 53 years, cabinetmaker, who died on the 7th of September after partaking of pork pies purchased at Derby.

'Dr. Benjamin H. Heywood spoke to making a post-mortem examination, and coming to the conclusion that the deceased had suffered from some intestinal irritant.

'Professor Sheridan Delepine, of Owens College, Manchester, said that he discovered bacilli in the deceased's stomach of a character which was known to have produced outbreaks of disease similar to that at Derby. He discovered exactly the same bacilli in samples of pork pie which he examined, and also in the blood in the case of another person who had died.

'There was no evidence to show that the flesh used in the making of the pies was contaminated, but the jelly was full of the bacilli. He supposed it became infected in the course of preparation.

'It was a peculiarity of these particular bacilli that their presence in food could not be detected either by taste, smell, or sight. The person who made or sold the pies could not possibly tell that there was anything wrong with them.

'He had examined the premises where the pies in question were said to have been made, and though they were better than the average number of such premises, there were several possible sources of contamination.

'Dr. Howarth, the medical officer of health for Derby, agreed that the business was well managed. In the light of Professor Delepine's conclusions the witness thought that the process carried on at pork shops generally admitted of some criticism, and he intended to prepare an exhaustive report to the

Derby Corporation with a view to minimising future risks.

'He considered that the whole question of the management of pork butchers' slaughterhouses and pork pie shops should be opened up as a result of the present case.

'Mr. James Cope, pork butcher, of Irongate, Derby, volunteered evidence, and said that he was away at the time the pie was said to have been purchased, but he had full confidence in his servants.

'The jury found that Swinson died as the result of eating pork pie accidentally contaminated by poisonous bacilli, and that no blame could be attached to any person engaged in the preparation of the pie.'

We have given this extract for two reasons—it is a recent case, and it is a concrete one. The circumstances are well within our knowledge. We need to restate nothing. We may take and examine things as they are presented to us by this account.

1. *A man eats pork pie and dies.*—It is a case of *post hoc propter hoc.* Many men eat pork pies and do *not* die. These pies are always unwholesome food, but they need not on this account cause death. Why, then, did this man die? 'He died because he ate the pie.' The reasoning, to say the least, is not very sound. We do not always know, and cannot know either, the nature of an illness or its cause. We had a poor woman near us ill more than nine years. I took many people, doctors and others, to see her, but nobody could ever say what was the matter with her. We have a man suffering now from a nerve trouble. The doctor, on his certificate, describes the illness as 'general debility,' and yet there is not a stronger man in the place. I could tell some very funny stories here.

2. *The doctor, after a 'post-mortem,' says it was some intestinal irritant.'*—What can this mean? He would have been as near the truth if he had said, 'the cause of death is not easy to determine.'

3. *A professor finds bacilli in the stomach.*—He found these same bacilli—(1) in pork pie, (2) in the blood of another person who had died. In three cases, then, he found bacilli. The inference is, that as the bacilli were found in the pie, this pie was the cause of death.

4. *No microbe in the flesh, but only in the jelly.*—This statement is contradictory. We have just been told that he found bacilli in the samples of the pork pie. Now it is only in the jelly!

5. *Infected in the course of preparation.*—How could this be? If it could be so in one case, it would be so in every case. And no one could eat pork pies at all.

6. *Impossible of detection.*—I think this is perfectly true, but not in the professor's sense. There were none there. How could the jelly be full of them, and yet they could be impossible of detection? We know when there are maggots in cheese. And are not bacilli a vegetable product?

7. *There were possible sources of bacilli in the premises.*—This is so always, if we are to believe the authorities.

8. *An exhaustive report to be prepared.*—This has been done, and it is as follows:—

'At a meeting of the Public Health Committee of the Derby Corporation, held last evening, Dr. Howarth, medical officer, stated that any ante-mortem condition of the pig was not responsible for the poisoning, and the flour, lard and seasoning employed were also above suspicion. In his opinion either the meat or the jelly, or both, used in the pies became infected in the course of preparation.

'Professor Delepine's report supports these conclusions. In addition, he has been able to isolate a bacillus belonging to the colon group, which he declares is undoubtedly responsible for the pathogenic properties acquired by the pork pies. The Professor says: The evidence as to the relation of the bacillus to the epidemic is absolutely clear. The bacillus in question has been isolated first from pork pie, which you sent me on September 8th; secondly, from pork bone pie received on same date: thirdly, from the blood, spleen, and intestines of a fatal case; fourthly, from the blood, spleen, bile, and intestines of several animals that have died in two or three days from the effects of feeding on the pork pie and the pork-bone pie; fifthly, the bacilli obtained from all these sources are identical in appearance; sixthly, animals inoculated with the bacillus have died, and in their blood the same bacillus has been found; seventhly, four specimens of blood obtained from patients who had been ill after eating of the pork pie have given with the bacillus clear serum reaction; eighthly, the blood of normal persons and of patients affected with typhoid fever has given no similar reaction with the bacillus; ninthly, I have also been able to ascertain the presence of the same bacillus in a pork pie, which Professor Robertson, of Sheffield, has kindly sent me at your request, and which I received on September 10th.

'Dr. Howarth explained to the committee that the colon group of bacilli are excretal bacilli, and might very easily have been conveyed by the air without any negligence on the part of the pork butcher, and, in fact, might be due to purely accidental circumstances.'

We have seen that the trial of the case, far from proving that bacilli were the cause, did nothing so much as introduce contradictions. We will now examine the report itself.

1. *The pig was not responsible for the poisoning.*—This should go without the saying.

2. *The flour and lard were without suspicion.*—How does he know? These things might have been adulterated. The flour is scarcely ever a *pure* product of the wheat. In Minnesota the veriest rubbish is ground up into flour and *sent to us.*

3. *He thinks the meat or the jelly became infected in the course of preparation.*—How? Whence could the bacilli come? Did they fly? Is the jelly not a consequence of the cooking? It is not all put in the pie. Besides, we have been told the meat was all right, but the jelly was full of bacilli. How is this?

4. *The Doctor and Professor agree.*—We do not wonder at this. Their minds are saturated with the same ideas. They cannot give an unbiassed opinion. They find, not what is there, but what they wish to find there.

5. *A bacillus belonging to the colon group has been isolated.*—What was its habitat? How did it migrate? How was it differentiated?

6. *This bacillus produced the disease.*—Pathogenic—or disease-producing—is a word that people do not understand. It conveys no meaning but only mystifies. These bacilli take time to develop. The time in this case was altogether too short.

7. *The bacillus and the epidemic are cause and effect.*—This cannot be true, for there was no epidemic. How could one bacillus—and it not eaten—cause disease? We must, however, notice that the Professor speaks of this in a special way and with a

special sense. It has a generic meaning. *One* is used for *many*. The bacillus caused the epidemic. It was found in the food. It was found in the person eating it. Ergo, it was the cause. The reasoning seems plausible. But it does not bear inspection. Pork was in the pie. Pork was in the person. Ergo, pork was the cause! We have yet to have it proven that bacilli would cause death. Bacilli have to multiply enormously before they can effect anything, if they ever do. It is, therefore, just as reasonable to say that the pork caused the death as that the bacilli did.

8. *The nine reasons.*—These need not trouble us. It will be time to examine them when the Professor has shown (*a*) that there was an epidemic, and (*b*) that death was caused by a bacillus. Why, if this position were correct, we should endanger our lives every time we ate food. How could we know whether our food contained bacilli or not?

9. *The colon group are excretal bacilli.*—In this case they would go to the manure heap. This would be their habitat.

10. *They were conveyed by the air.*—See what this means. The stableman endangers his life every time he takes manure from the stable. The bacilli may easily fly from the barrow and get on to his lungs. But a bacillus has no wings and cannot. Will the professor explain these things?

11. *The colon generates bacilli.*—Is this true? I suppose the professor intends us to understand by the colon the part of the bowels that is so described, the larger bowel immediately above the sphincter.

The truth of the matter is, that the language is so technical and so unintelligible to the ordinary mind, that it only mystifies the jury. It sounds very grand. The upshot is that a juryman says, 'I cannot understand it; but I suppose it is all right. It is your business, and not mine. You are responsible, and not I.' Here the matter ends. And so the thing goes on. The microbe holds its ground. And the world thinks that the doctors and professors are very clever.

What was the upshot of the trial? The doctors so far have the best of it, and the theory receives no shock. But if the microbe was *not* the cause of death, what was? This is a question to which no really satisfactory answer can be given. But this is true of many questions.

About forty years ago, as I well remember, two young fellows went from Hanley one Sunday to see their aunt. It was a journey of some five miles, and they walked very fast. When they arrived, as the weather was warm, they were very heated. They did not wait to cool at all, but sat down forthwith to tea. They both ate heartily of *celery*. They died the same day. What caused their death? A microbe? The microbe was not born then! It will be in the recollection of some of my readers that Madame Neilson died almost as suddenly as these young men. She was singing at a concert, and became very heated. She ate an *ice* in her heated state. The death of this famous singer so suddenly in this way was a sad blow to many. But what caused it? A microbe? It is more than probable that the cause of death in both these cases was the same—the sudden change of the temperature of the system. The young fellows ate immoderately of *cold celery*. Madame Neilson took an *ice*. The sudden change of the temperature caused by the cold stuff would bring about a collapse, and so death. This is the most probable explanation. We know that the same causes do not always produce the same results. Why? Who shall say? We know they do not, because many have done as Madame Neilson did and as these two young fellows did, and have suffered nothing. I remember myself drinking a glass of very cold milk in the Black Forest when heated and being slightly ill after it. I have not repeated the operation. It is not wise. My two companions, however, did the same as I did, and were none the worse for it.

It is more than possible that something of this kind explains the deaths in connection with the pork-pies. And, if the microbe theory had not been in vogue, nothing would have been said of it. As it is, there was nothing for it but to exploit it. Are the doctors then not honest? Yes, of course they are. The fault is not theirs. They have no option. The theories of disease and the means of cure change with the age. Years ago, yet not further than I can remember, the great means of cure was cupping and bleeding. I was myself bled for inflammation of the eyes. My mother strongly objected, though she permitted it. Her ground of objection was that I had *no blood to spare*. In this she was quite right. We know, too, that Gil Blas's universal specific—like the doctor's on board ship, "pill No. 9"—was bleeding and warm water. The doctors have to combat the microbe as the cause of disease, and they must therefore find it and tell us all about it. It is not they, therefore, but the theory that is to blame.

The strangest thing is, that when they go to deal with disease they do not *attack the microbe* itself, but only the mischief it has done. Why is this? We must leave this point and proceed to discuss another matter. *Nous ne pourvons pas arranger tout.*

The other point is this—the microbe theory is not yet *ripe* enough for attack. It is not old enough, and there is nothing else to take its place. I am but a pioneer, but I hope one who will be successful. I will give a letter or two to illustrate what I mean. I want to kill the microbe once for all; or, if I cannot kill him outright, I must put a scotch in the wheels of his chariot. What a business it is that so small a thing should create such a world of bother!

'*August 26*, 1902.

'DEAR MR. SANDLANDS,

'Having seen and bred microbes, I cannot admit a denial of them in these pages. I have classed them with "germs," which they really are. You are right in saying they are agents for promoting corruption on the dissolution of organic bodies and products. To attempt to abolish and stamp out the microbe of tuberculosis, which is *ubiquitous* and ready to pounce upon degraded bodies, is of course utterly *chimerical.* A more practical but equally futile plan would be a crusade of annihilation against the worms and maggots in your churchyard. Apologising for suppressing your eloquence, believe me,

'Yours sincerely,
'THE EDITOR.'

I will only say, in connection with this letter, that I do not believe microbes are agents for promoting corruption. I do not see, therefore, how I could have said it. What I do believe is this—that what are called microbes are the *products* of corruption—which is a very different thing. The following is an extract from another letter:—

'Herewith I send "proof" of your letter on "Putrefaction." It seems to me that you had better restrict your observations to the *practical* side of sanitation, as you do not understand the science of putrefaction or fermentation, and your discourses on them will be only laughed at by persons who do understand their processes.

'THE EDITOR.'

'DEAR MR. S.,

'Thanks for the paper containing your lecture. Of course I am too prejudiced to agree with what you say about microbes. You see, I have understood that the difference between a bee and a microbe is that the latter is a minute organism of a parasitical nature, preying upon human tissue, and endowed with a property of multiplying its species million or billionfold per hour, either by fissure or by generation —the disease consisting of the morbid condition of the tissue consequent upon the presence of the *malignant* microbes, or the poisonous product the microbes leave behind as they die. Hence putrid water in which the diphtheria microbe is present will, if introduced into the human system, *tend* to produce the disease, and under certain conditions will produce it.

'Yours, &c.,
'J. W. P.'

It would not be difficult to produce evidence of this kind almost indefinitely—written and verbal. The feeling in favour of microbes is very general and very strong. The newspapers are so enamoured of the idea that they will not admit a single word against it. I have tried many and many a time to obtain a hearing, but in vain. This is true of all the leading papers. The idea explains nothing, but it serves a purpose. It is the fashion for the time being, and must remain so. The fashions change. This one will change too. I mean to hammer away—if I may use an Irish 'bull'—as long as I can hold my pen. I can already see, as I have observed, a rift—shall I say in the '*clouds*,' or in the '*lute*'?—is there any way, and I must make it bigger by all manner of fair means. We have already had occasion to notice a hesitancy in the articles by Sir William Collins and by Dr. Leal. These outspoken doctors will speak louder yet when they see their way more clearly.

But it is time we began to drive our last nail into the coffin of this microbe. We have to consider the *genesis* of the microbe.

The microbe is a *vegetable* product. This simplifies matters very much. We have already noticed that much that is done is done on the principle that it is an *animal* product, whereas it is nothing of the kind. The microbe is generated in the putrefaction of vegetable matter, and in that alone. The microbe is called an *organism*. In what sense is it an organism? Who shall say? An organism ought to be an assemblage of organs. Has it a stomach, heart, liver, &c.? It is so small that it absolutely defies analysis. Then why call it an organism? Can it generate itself? It would seem, on the face of it, that an answer to this question, if possible at all, would be a decided *No*. It is not an animal; it has no organisation; and it cannot generate itself.

The microbe is also a bacterium. This word means 'a little rod.' It is so called because its shape is rodlike. It is, or is thought to be, a single cell—no animal, therefore—and it is so small that it can only be seen under a powerful microscope. As the bacteria or microbes assume several shapes they are known under their respective varieties by several names—'micrococci,' 'diplococci,' 'bacilli,' 'streptococci," 'spirelli,' 'spirochætæ,' &c. It is not necessary for our purpose to notice those particulars that differentiate the varieties. Their shape, size, number are matters of no moment. We cannot differentiate them further. We want to know their functions. That is our point. They are said to be the authors of all the ills to which flesh is heir. There is on the face of the assumption an *argumentum impossibile*. Our business is to study this point a little.

Is the microbe parasitic? Does it feed on organic matter? Does it attack living organisms? Microbes, so it is said, are found in certain fermentations, in putrefactions, and in diseases. But how are they found? As the cause, or as the effect? We must not pre-judge, but examine.

Milk turns sour. Why? The philosopher—the modern one—says a bacterium grows up within it, and this is the cause. But where did it come from? The moon? But where? No answer comes. No answer seems to be needed. This bacterium turns the sugar into lactic acid. How can this be said? We do not know until we can say the bacterium has entered from some distinct place. I submit that the whole process, inexplicable though it be, is one of *nature*. The milk cannot retain its *statu quo* beyond a certain time. It is ripe, and must turn putrid. Why? Who shall say? We only know it is a matter of experience that it has its turn to change and decay. Bacteria—microbes are there forthwith. Where do they come from? Whence can they come? No whither. They are generated from the milk, and as a consequence of the change. Putrefaction, in other words, is their one and only parent.

Again the question arises, Why does putrefaction set in at all? Why does the milk not remain always sweet? Who can say? There are those who say that bacteria cause it. In this case it would be a simple matter of: Destroy the bacteria, and Live for ever! This would be a royal road to Elysium. But how would this work? There would be *no change in Nature.* All would be progress in life—no decay, no death. What a happy time! We may philosophise as we will, but facts destroy our philosophy. This is the order of things—Life, growth, maturity, decay, death, putrefaction—either with or without microbes. This is the chain of things, and we cannot alter it, exercise our philosophy as we may. The philosopher may say bacteria must produce bacteria; but he cannot prove it. Corruption may produce corruption, putrefaction may produce putrefaction, and this again bacteria; but bacteria do not produce bacteria. Spontaneous generation may frighten him; but facts do not alter. Facts do not trouble themselves so much as to laugh at our philosophy. They remain sullenly silent, eternal as the ages.

But now take milk and boil it. What next? It does not grow sour, putrify, or produce bacteria. At least it remains as it is for a time. How is this? It may be said that we have killed the bacteria. But there were none there. Take now some plums, boil them, add a little sugar, and they do not produce bacteria either. How is this? The nature of the milk and of the plums has been changed by the boiling. They were once natural food—life-giving, life-producing. They are so no longer. This explains why they do not produce bacteria.

Take another illustration. Put a piece of raw flesh in a bottle, stop the bottle with cotton wool, and the flesh putrifies, but it does not *produce maggots.* Do the same with vegetable matter. The same thing obtains. How is this? This is what is called 'sterilising. But see that the whole process is worthless! Boil milk, and it is sterilised. It will not produce maggots. True. But it is no longer *food.* It will neither support nor produce life. (See my "Natural Food.") It returns to the earthy, that is all. The reason the meat or vegetable product does not putrify and produce maggots or microbes is because light and heat are shut out. These two factors are necessary. Why? We can only say experience teaches us so. We do not know why.

It appears, however, that if bacteria are introduced into the bottle, they so influence the putrefaction that further bacteria are produced. How is this? We do not know. It is supposed that this shows that putrefaction cannot of itself produce bacteria. *And yet no bacteria need be introduced if the putrefaction be exposed to the light and heat.* In other words, if we will have bacteria in the bottle, we must introduce them; under other circumstances, it is not at all necessary. They come of themselves.

We must go a little further. Animals die of anthrax. Anthrax is supposed to be due to the invasion of the body by a living organism of microscopic size, which possesses the power of excessively rapid multiplication under suitable conditions. It is said to be caused in man by inoculation from the skin of animals which have died of it. This is sometimes impossible to prove—men take it without inoculation. How does the first animal take it? It is more frequent in animals than in man, and carries many away at a time. Pasteur inoculates for it; but with what success it is impossible to say. There is a special interest attaching here, because men first learnt from it that epidemic disease was caused by a bacterial parasite. They are so minute that 200,000 of them placed in a row will only make three feet. The blood of animals dying of anthrax teems with them—a single drop may contain millions! There are many difficulties in all the supposed facts about the anthrax bacilli; but one is enough. It is a parasite. Then how does it get into the blood?

We notice again that the blood of animals which die of anthrax contains bacilli. This blood put into the blood of other animals conveys anthrax. What now? Don't use the blood for such a purpose. That is the philosophy of that proceeding. We do not know what life is. We cannot, therefore, know what disease is. Anthrax is a disease. The blood of the animal is vitiated. Put vitiated blood into pure blood and it will be vitiated too. The vitiated blood may contain a microbe or it may not. It is all the same. Therefore, keep it out. This is the logic of it all. Of what use is it to know that filth of any sort introduced into the blood causes disease? We do know it without experiments of this kind. And if they teach one thing more than another it is: to keep the vile stuff out of the blood. And here it is worthy of note that on this principle vaccination is condemned. Why introduce lymph into the blood? It is filth, too. Does *it* contain no bacilli? Who knows? We know it produces disease. The philosophers who are so fond of the bacilli are condemned out of their mouths.

The 'germ' theory is said to be established in this way. It is, by the way, also a *new* theory. Are we now to regard the *bacillus* as a *germ?* We must let it pass, for it is one of those things that bewilders us. Microbe, bacillus, germ. A pretty trio. It is like the three cards of the thimble-rigger. But now what is a 'germ'? It is the seed beginning to grow. But how can anything at one and the same time be a seed and a germ? We must leave this puzzle for the bacteriologist to unravel. It is beyond our power. Koch discovered the consumption germ, bacillus, or microbe. He also discovered the way to destroy it. This was some twelve years ago. I wrote there and then to the *Times* saying that Koch's remedy for consumption was a spurious remedy. The *Times* snubbed me. It has taken the faculty twelve years to discover that what I then said was true. It acknowledges now that it is so.

In the same way the bacillus of glanders, leprosy, tetanus, diphtheria, cholera, typhoid, and erysipelas are discovered. And yet they cannot arrest the diseases. And they cannot differentiate the bacilli each from the other. They know all about the microbe—his size, his number, his mischief, and his habitat—but not his *nature*—and yet they cannot kill him! One would think that if the microbe can be *located*, it would be an easy matter to kill him, and so end the matter.

It has been discovered that heat and cold do not affect the 'germs.' And yet heat is the best disinfectant. These facts are, however, *nihil ad rem.* I mean that the knowledge does not help us much, beyond this—they cannot be destroyed either way. We could not use heat to destroy them in their *habitat*, if it happened to be the blood of a person, and for similar reasons we could not use cold. And yet attempts are made to destroy them.

The following paragraph, quoted from the *Daily News* by *St. James's Gazette*, practically admits the harmlessness of the microbe, and then immediately contradicts itself by calling it an enemy:—

> 'HEALTHY BLOOD V. MICROBES.
>
> 'Microbes stand very little chance of success when they are met with pure, healthy blood. Healthy blood is their poison. That poison, therefore, should be dealt out to them in abundant measure. And we provide it most effectually by eating right food and by breathing pure air. By living in a vitiated atmosphere, especially if its deleterious properties be added to by the absence of sunlight, we are providing rations and storing up munitions of war for the enemy.'

This re-embodies Sir William Collins's dictum, 'Healthy blood is fatal to the microbe.' And then it talks enigmatically about 'blood being poison to the microbe.' The writer tells us how we provide ourselves with healthy blood—it is by 'right food' and 'pure air.' What is right food? A hundred different answers would be given to this question, and it is more than possible that some would suggest food that was anything but right. Then the writer says, 'Vitiated atmosphere . . . provides rations, and stores up munitions of war for the enemy.' This is very poetic. What does it mean? It is very like much that the authorities say; but it does not bear scrutiny. Who is the enemy? The microbe. Can he use weapons? How then does he wield them? But if he can wield weapons against many and use 'bad air' and 'absence of sunlight,' he must be very powerful and expert. How does he do it? Whence does he come? It is very evident that he talks nonsense. But let it be known and well marked, that they who live in vitiated air are just the persons who do *not* suffer. The *Daily News* must go and learn its lesson better. So far it has only learnt the half. 'Get healthy blood' is good advice. 'Fear the microbe' is foolish. 'Tell the truth and shame the devil,' says the proverb. Paraphrased, we may say, 'Keep healthy and you need fear neither disease nor its microbe.'

CHAPTER X

THE 'ANTISEPTIC TREATMENT'

To raise up a man of straw and batter him down with artillery is not a wise proceeding. A man of straw is harmless. The forces, when they include artillery, are more than enough for the operation. And yet this, or something like this, is done every day. I do not say, or even intimate, that this exactly describes our present work. An outsider, an uninterested person, might possibly so regard it. I could understand, and perhaps justify, his regarding the microbe in the light of a man of straw, and the forces we are using to shatter him as heavy artillery. But I would not myself so describe the proceedings. The microbe, whatever he is—real or mythical—is a tremendous power. We need, and must have, more than ordinary forces, and all playing upon him energetically, if we would get him out of the way. We are contending with something much more formidable than a man of straw. I have had this in my mind all along. I have it in my mind now. What I think is nothing to the point. It is what other people think that just now concerns us. It behoves me, therefore, in dealing with the 'Antiseptic Treatment,' neither to raise up a man of straw nor seek to batter one. I shall try to be quite clear and specific.

All things change here below. This is true in nothing so much as in fashion and in men's opinions. These things are not long stationary. What is true to-day may be false to-morrow. The changes, however, in 'sanitation' are not quite so rapid as this, for in this matter men are not quite so fickle. The minds and opinions of those who 'sanitate' are like those of other men, and are subject to the changes of the time. We have seen that sanitation is mainly concerned with health. This implies that its object is that which attacks health, viz., disease. The theory of disease is one thing to-day and another thing to-morrow. It is difficult to say what it was thirty years ago. To-day the microbe is the occasion of nearly all the diseases to which flesh is heir. The remedy, as we have seen, years ago was bleeding. Now, however, the microbe is our great enemy, and bleeding does not kill him. Another remedy must be sought. Hence the 'Antiseptic Treatment.' This then is our subject: 'The Antiseptic Treatment as a preventative of disease.' It enters not only into the Sanitarian, but also into the healing art. It is used not only as a *preventative*, but also as a *healing power*.

What does the word mean? Its derivations are ἀντι and σηπτω. The prefix means *against*, the root signifies to *putrify*. Antiseptic, therefore, means 'against putrefaction.' And so an antiseptic preparation is supposed to prevent, or otherwise destroy, putrefaction. It prevents it in things disposed to it. It destroys it in those things in which it obtains.

We will here remind ourselves of a saying we have already quoted, one that is as old almost as Adam—

cito maturum cito putridum. This implies that putrefaction follows quickly upon maturity, so that the field for the antiseptic treatment is very large. It means also that the sooner it is ripe the sooner it begins to rot. When life leaves a body, whether animal or vegetable, the principle that held the parts together is gone. That principle was *life*, whose nature we cannot understand. The principle no sooner takes its departure than the parts which composed the living body begin to separate. The change is variously called decomposition, adepocere, putrefaction, and fermentation. Adepocere is the name given to the substance produced by a number of dead bodies decaying *en masse.* It does not seem to produce microbes, and so need not trouble us. Decomposition is a word usually applied to that process by which the parts of animals once living return, when dead and buried, to their original constituents. It also describes in some sort the same process in trees when, as timber, they do the same. We may therefore dismiss it too. Decomposition, so far as I can discover, is not supposed to produce microbes. Fermentation and putrefaction are two names for the two kinds of the same process. They are both used of animal and vegetable changes. We ought to notice here that both are more applicable to vegetable than animal change, inasmuch as we usually bury a corpse quickly out of our sight. These names then describe the process by which the change is effected when these things *cease to be organic.* The factors which distinguish decomposition and adepocere from fermentation and putrefaction are light, heat, and moisture. These factors are indeed absolutely essential to them. This is a point that is frequently overlooked. The two things—processes rather—of fermentation and putrefaction are often very difficult to differentiate. For instance, wine is made—or ought to be—from grapes. Red wine is made from black grapes. White wine is made from white grapes. The fermentation takes place in the former *before* putrefaction. White wine, I believe, as Sauterne, is made from white grapes *after* they have become putrid. The juice in making cider is extracted equally and without prejudice from either the putrid or the ripe fruit. We have not entered fully into a description of fermentation as distinguished from putrefaction, or *vice versâ*, as the processes are generally understood. We have noticed as much as suits our purpose.

We will now put a few facts before our minds in order to see the different and differing results of putrefaction and fermentation. They are important, inasmuch as they illustrate the point that they produce *life* and not *death*. If, however, this life could again produce itself (impossible as I conceive), life would become impossible.

1. Flour mixed with water will generate little things like eels.

2. Dirty teeth will generate something like microbes.

3. The yeast-plant grows from the globules formed by the yeast in flour.

4. Soft water will generate worms, which, rising from the bottom to the surface, become gnats.

5. The fermentation of the corpse will produce fungi in the vault.

6. Personal filth—corruption, putrefaction—produces lice.

7. Decaying cheese generates maggots.
8. Rotting timber produces lice.
9. Decaying matter in swamps gives off mosquitoes and gnats.

Our readers will, no doubt, be able to remind themselves of many more things of this kind. 'There are more things in heaven and earth than are dreamt of in our philosophy.' The point, however, that we need again and again to emphasise is this, *putrefaction does not destroy life so much as generates it.* The other point to emphasise is that these things do not *reproduce themselves.* If they do, where is the evidence? There are evidences that they corrupt. Introduce them into the blood, and they vitiate it. But do they introduce themselves? When? Where? How do they? To these questions there are no positive answers. There are only conjectures. We do not raise structures on theories. We want, and we must have, *evidence.* We have it in abundance, but it is all the other way. The microbe is less than the least of all the little things in our list above, and yet he is the author of all our ills! The microbe cannot leave his habitat. It can neither walk nor fly. It is withal *outside.* Outside let it remain. It can do us no harm.

But the 'Antiseptic Treatment' deals with it. Let us see what this treatment is. The antiseptic is used to prevent or arrest spontaneous fermentation or putrefaction of animal and vegetable material. Of course the antiseptic varies with the object of its application. Antiseptics are (1) salt, (2) sugar, (3) mineral acids, (4) spices, (5) alcohol, and (6) perchloride of mercury. Besides these things there are drugs that are supposed to arrest putrefactive changes.

We need not enter into any discussion as to the way in which the antiseptics work. The employment of these things is so general that we have no difficulty in calling to mind instances. We have only to mention the words 'pickles' and 'preserves' to find them operating like magic in this direction. Our examination therefore does not lie here. We have nothing to gainsay in anything of all this.

What we do say is that the value of the antiseptic in the 'antiseptic treatment' depends on a fallacy. And that fallacy is that microbes *cause putrefaction. They do not cause putrefaction.* We must say this with all the emphasis possible. Does rottenness cause ripeness? The pear must be ripe before it can become putrid. And so putrefaction is antecedent to microbes. 'Putrefaction generates microbes.' Putrefaction is the change in the vegetable matter antecedent to its return to earth. Microbes are of its nature. In other words, putrefaction is otherwise impossible. The sanitarian says the antiseptic destroys the microbe. He should rather say it arrests, or otherwise prevents, the putrefaction. He cannot destroy the microbe without stopping the progress of putrefaction. The sanitarian thinks stopping the putrefaction is equal to killing the microbe. What shall we say to him? To empty the well means to stop the pump. Of course it does! And so stopping the putrefaction also stops the microbes. The things are equal. It is just as sensible to say that stopping the buckets of water is the same as emptying the well as to say killing the microbes is the same as arresting the putrefaction. In neither case can you have the one without the other.

And again we are calmly, if not meekly, told that microbes and bacteria cannot live *without air*. This is supposed to be a very useful piece of knowledge. And yet it is a matter of everyday experience. It is also, and equally, a matter of experience that to exclude the air is to prevent putrefaction. Microbes cannot live without air, because putrefaction otherwise is impossible. We are philosophically told that the oxygen causes putrefaction. Yes, it causes putrefaction just as much as it makes the fire to burn. There would be no fire in the grate if there were no burning coals there, and so there would be no microbes in any substance if putrefaction were absent. Oxygen bears the same relation to the one as it does to the other. And if it causes the one it causes the other too. We do not need the philosopher to tell us these things. They are matters of daily experience.

There is yet another factor. Moisture also is necessary.

All this constitutes the secret, if it may be called a secret, of much of our trade with America. On these principles the Americans send us by the ton meat, salmon, fruit, and what not. Some one says of the Americans, 'They eat all they can, and they *can* what they can't and send it to us.' Light, air, heat, and moisture are the great factors in putrefaction. And they, too, are the great progenitors of the microbe.

What is called in modern phraseology the antiseptic treatment of wounds depends on the same fallacy. It was—rather it is—supposed that the surface of a wound affords abundant scope for the development of microbes, and it is said that this used to be very common, the wound becoming foul and gangrenous. Now, however, the surgeon cleans the wound, and uses antiseptics. This is plausible. One would suppose that the surgeon would under any circumstances always keep the wound clean. I should like to add that it would be cleaner, and every way better, if the antiseptic were kept away. Nature is better left to her own resources. It is far better to work on her principles, and see that nothing hinders her.

But now comes the rub. These antiseptics are given *internally*, but they answer no good purpose. The antiseptic kills the microbe, but it kills the patient too. The problem still remains to be solved, How we can kill the microbe without harming the patient. This is the problem of all problems. So far the efforts in search of a solution, though long and arduous, have all been fruitless. I have heard a consumption patient say many a time, "I should soon get well if it were not for this cough." But the cough and the disease are inseparable. It is even so here—the microbe is the disease. Kill the microbe, of course! But how? Kill the disease. Then what? The Millennium!

Antiseptics are also used as *disinfectants*. We shall deal with this matter separately.

If we dealt with the Antiseptic Treatment exhaustively it would mean an examination of *all* the methods which have been in these later days tried, and have failed. This would be a long business, and we must not attempt it. We will only notice the last, of which the following cutting from one of the 'dailies' gives a brief account:—

'VIENNA, *Sept.* 27.

'The discovery of a serum cure for scarlet fever by Dr. Moser, assistant physician at St. Anne's Hospital for Children here, is exciting a lively controversy in Viennese medical circles.

'The *Reichswehr* to-day publishes interviews with several prominent physicians, urging the public to exercise caution and patience, and to await further investigation before fully accepting the new remedy.

'It is pointed out that the use of serums generally, including even the diphtheria serum, is still strongly opposed by some of the highest medical authorities, and that Dr. Moser has so far only made experiments in eighty-four cases—a number far too small to yield any really definite proofs regarding its value. The percentage of cures also, it is stated, should have been much higher to justify the statements which have been made on behalf of the serum.'

The above may be left to tell its own tale. Beginning with Koch, and coming down the whole gamut, the experience is still the same—*No result.* No remedy whatever against disease. The reason is we begin at the wrong end. We ought to attack the *cause—causa causans*—and our objective is the effects. There is a far better way than thus fighting with this *idea*, that the microbe *causes* disease. It does nothing of the kind. The root of disease is not in it. '*Voilà, qui est fini. Nous sommes à la fin. La santé ne nous vient pas en tuant la microbe, mais en mangeant ce que nous nourrit.*'

CHAPTER XI

THE ARGUMENT FROM THE BLUEFLY

MY object in putting this argument before my readers is threefold. (1) To illustrate the way in which scientific data are sometimes established. (2) To show the obstinacy of newspaper editors; and (3) To clinch the argument. I will give the correspondence first.

'THE BLUEFLY.

'SIR,—

'It is commonly said the bluefly "blows" the meat. Is this true? Does the fly not come of the maggot? In other words, does the meat not generate the bluefly, first as a maggot, then as a fly? A butcher blew a bladder, hung it up in his room to dry, and by and by found a bluefly singing inside. How did the bluefly get there? A solution of this question might help us considerably to understand the source, the nature, and the habits of the microbe. Will your readers kindly say what they know about these things?

'Yours, &c.,
'J. P. SANDLANDS.'

The purport of the above was intentionally concealed. I was stealthily intending to lead up to a discussion on 'Microbes.' Years ago, in the *Morning Post*, I did a similar thing, and succeeded so far as to bring one of the great authorities up to the precipice. In another moment I should have had him over, only the editor stopped me. The answers received in this case were the following:—

'DEAR SIR,—

'You invite fellow-readers to say what they know about the above, and although I sent a letter to the editor of the above newspaper, the editor has probably found my communication too lengthy to print. But when I saw the facetious reply of W. A. W—— in this morning's issue I thought that you would not take it amiss if I wrote direct to you. In his presidential address to the British Association in 1870, Professor Huxley went into this very matter, and in such a way as to be understanded of the people. With regard to the fly in the bladder, I can only venture to suggest a solution, not knowing the exact circumstances in this particular instance.

'You did not mention from what animal the bladder in question was taken, but I suppose from either a bullock, sheep, calf, or pig, and if it was, the *modus operandi* in each case would be much the same. You will understand that I start with the assumption that you are not familiar with the ways of a butcher in the slaughter-house, so I will relate, so far as I am able, the manner in which he works. As soon as death has occurred the butcher proceeds to skin the carcase, or, if a pig, to scald and then scrape the hair from the skin. The next operation is to eviscerate, and the whole of the abdominal viscera is laid on a bench to wait until he has prepared the carcase proper for market. An hour may elapse before he has time to give his attention to the viscera, or as he calls it offal, during which time there is ample opportunity for any amount of blowflies to lay any number of eggs. We will suppose he has finished the carcase, and probably washed down his slaughter-house. He is now at liberty to attend to the offal, and I believe that the whole of the fat from the stomach and the intestines is scraped off, and the bladder separated. Very frequently the stomach and intestines are not sold, but given as food to pigs. One of the last things that he does is to blow out the bladder, and this is generally done with a straw or small length of clay-pipe stem, being inserted in the orifice of the urethra. At least you will see that opportunities have occurred for the deposition of blowfly eggs in the mouth of the urethra, although I should imagine it a most unusual occurrence. But, just as young chickens can come from nothing else but hens' eggs, neither can maggots that produce the blowfly come from anywhere but from the eggs of the blowfly. The maggot is but one stage in the metamorphosis of the fly. There is no question of microbe or bacteria at all. I believe I may say that biologists have *always* found like to produce like, and never figs from thistles, nor grapes from thorns.

'To sum up, the opportunities for the introduction of the blowfly egg or eggs at the bladder may be—

'1. Direct deposition in the mouth of the urethra.

'2. Introduced by the instrument used in blowing out bladder.

'W. E. H.'

This letter, given almost in full, is a very good illustration of scientific reasoning, and is amusing withal. I leave it without further comment.

'SIR,—

'To supplement your correspondent's observations, I may remark that it has frequently struck me that cabbages breed caterpillars, and caterpillars breed butterflies. Further, also, it is a matter of everyday knowledge that a straw nest will breed eggs, and from the eggs will come chickens. If we ponder rightly upon these matters (after supper), we may perhaps become better acquainted with the sea-serpent, not to mention the plesiosaurus and other such fowl.

'Yours, &c.,
'W. A. W.'

This letter is a specimen of a writer who, when he can say nothing, tries to be facetious. A device more happy, perhaps, than worthy of imitation.

'SIR,—

'I would suggest that Mr. Sandlands should read the presidential address to the British Association for 1870. In it this matter that puzzles him is dealt with in a simple manner, and in such a way as to avoid many of the scientific terms that bewilder the lay mind.

'He says, "Here are dead animals or pieces of meat. I expose them to the air in hot weather, and in a few days they swarm with maggots. You tell me these are generated in the dead flesh; but if I put similar bodies, while quite fresh, into a jar, and tie some fine gauze over the top of the jar, not a maggot makes its appearance, while the dead substances, nevertheless, putrefy just in the same way as before. It is obvious, therefore, that the maggots are not generated by the corruption of the meat, and that the cause of their formation must be something which is kept away by gauze."

'Perhaps if Mr. Sandlands is sufficiently interested he will verify this for himself.

'As for the blowfly in the bladder, any one who is familiar with the ways of a country butcher in the slaughterhouse will readily admit that there are more than sufficient opportunities for a blowfly to deposit any number of eggs in the neck of the bladder before it is blown out.

'W. E. H.'

The writer of the above tries honestly to say something useful, but fails. His reference to Professor Huxley is apt, and to the point. It might have led up to a definite result; but here the editor stopped the correspondence. This is the way of editors. This was not all. The editor in question also allowed some very severe and ludicrous strictures to appear upon a public lecture which I gave on 'Diphtheria.' When I pointed out to him the injustice of such a proceeding without allowing me the right of reply, he quietly told me the matter was crowded out. This was not only nonsense, but it was not true. I have tried the leading papers all round, and not one of them will allow one to speak beyond a certain point. Up to this point, yes; I may say what I like; but when I come to show up the foibles and follies of the age, no, I may not speak. A newspaper ought to exist for the purpose of spreading truth; but, like everything else in these days, its first and last object is the making of money. Such things ought not to be.

I could not, of course, allow the matter to drop. I forwarded the copy of the two following letters, which I induced a local paper to publish, but it was to no purpose, he would not allow me to speak:—

'SIR,—

'Will you kindly allow me to make public my answer to the strictures of the *General Practitioner* on my lecture. These strictures are somewhat severe. I have asked the editor for the privilege of reply, but cannot obtain it. My apology for asking you is the importance of the subject. There is such a thing, too, as fair-play, and this should count for something.

'I will first re-state the points of the lecture.

(1) "You don't know." (2) "It is not your business." (3) What is disease? (4) Meaning of names. (5) What is diphtheria? (6) Supposed causes. (7) Probable real cause. (8) What are the supposed cures? (9) What is the probable real cure? The lecture took more than an hour to deliver, and I spoke somewhat fast. It should have occupied about three columns, and it scarcely occupied half one in the paper whence the *General Practitioner* extracted. The imperfect report may, therefore, explain something; but it does not condone all. The Editor gives an opinion principally of (1), (2), and (5). We will deal only with (5): What is diphtheria?

'He says, "Dealing first with the pathology of diphtheria, the reverend lecturer said the disease really signified a "double skin," and the person who suffered from it got a second skin in the throat covering the natural one! This pathological pronouncement is very lovely, even for a parson." This, as Harpogon would say, "ought to be written in letters of gold on our kitchen mantel-pieces."

'May I first ask what the editor means by the expression pathology of diphtheria? I will translate it for his aid. "Disease discourse of double skin!" I think this beats the reporter's account of my words. Then may I say I dealt first with the meaning of the names of diseases, and showed how ridiculous these names were? I took diphtheria as an illustration. It means "double skin." We may have a double skin anywhere. What idea does the name convey? I gave many illustrations of this very thing. What will the editor say now?

'I said distinctly that I did not know what diphtheria was. I had never seen a case before. I said further, and I am prepared to say it again and again, that the child who died, as it was alleged, of diphtheria, died of no throat disease. I challenge him to prove that she did. There was manifestation of trouble in the throat, but there was nothing there to cause death. This is a very common occurrence. How many of our throat troubles come directly from the stomach? How many, again, from the liver? The cause of death was an internal one These were my points. I made them as clear as the English language would allow me. I do not talk Latin when I speak to an English audience. All my other points were made equally clear and were equally convincing. I do not follow the Editor further, and refuse to notice his aspersions. We do not advance truth by throwing mud. Will you allow me, Mr. Editor, the further indulgence of setting forth these propositions for the consideration of the "General Practitioner":—(1) Disease is one; (2) The cause is one; (3) The cure, where possible, is also mainly one.

'Yours very truly,
'J. P. SANDLANDS.'

'SIR,'

'Kindly allow me to put before your readers, especially your public analyst and Sanitary Authorities, these propositions:—(1) Putrefaction generates maggots, otherwise microbes: (2) Maggots may generate flies; (3) Maggots do not propagate themselves. Professor Huxley says, quoting Francesco Radi: 'Here are dead animals or pieces of meat. I expose them to the air in hot weather, and in a few days they swarm with maggots. You tell me these are generated in the dead flesh; but if I put similar bodies, while quite fresh, into a jar, and tie some fine gauze over the top of the jar, not a maggot makes its appearance, while the dead substances putrefy just in the same way as before. It is obvious, therefore, that the maggots are not generated by the corruption of the meat, and that the cause of their formation must be something which is kept away by gauze.' All this is very plausible reasoning. It is that too of thoughtful and practical men. Coming with such authority we think there is nothing for it but to accept it.

Things, however, are not exactly so. We will first notice a similar fact, and then see where the mistakes lie. Take an egg and lay it aside in an ordinary place. In due course it will putrefy. If we take the same egg and put it under a hen, she will hatch it out and produce a chicken. The cases are analogous and simple matters of experience. Now for the mistake in reasoning. The professor would have us believe the maggots are not generated in the dead flesh. We ask, where then are they generated? They are not generated when the jar is covered by gauze. The chicken is not hatched if the egg be laid aside. There is no heat in the one case and there is no heat in the other. It is the presence of the heat in both cases that causes the generation. It is the absence of it that allows nothing further than putrefaction. There is absolutely no reason to suppose that the case stands otherwise. We know furthermore that by freezing we can obviate both putrefaction and the generation of maggots. This view of matters, and I maintain it is the true one, is very far-reaching in its effects. What does it mean? These are some of the results: (1) Maggots, alias microbes, do not propagate themselves; (2) Microbes, as it is foolishly supposed, do not cause disease; (3) If (1) and (2) be not true human life would be impossible.

'Yours truly,
'J. P. S.

'September 23, 1902.'

These letters do more than illustrate the *modus operandi* and principle of action of some of the 'Dailies'; they *clinch the argument*. We may leave the subject where it is, though it is tempting to me. I might again show the reasons given for the presence of the blue-fly inside the bottle to be inconclusive, only that it would be slaying one who's already dead.

CHAPTER XII

DISEASE

It is very difficult, in dealing with a subject so prolific as Sanitation, not to repeat one's self. We have had occasion already to say a great deal about disease. But now we devote an entire chapter to its consideration. We have said, more than once, that to 'sanitate' ought to mean to promote health, and in that way to prevent disease. Our argument has tended to show, that in neither of these senses has modern scientific Sanitation accomplished its object. We are now going to deal with the nature of disease and its causes. It is more than possible, though it is not fair to prejudge the case, that we shall have something revealed, which will go a long way towards enforcing the view that Sanitation scarcely does more than *touch the borders* of the realms of disease.

We have seen that the *nature* of disease cannot be defined. The word itself simply suggests that there is want of *ease* in one or more organs of the body. This, however, does not help us, inasmuch as it neither tells us the *nature* nor the *cause* of disease. The classification of diseases, and their respective names, add nothing to our power in preventing or removing them. Our aim in either case would be definite, if we could settle, or even surmise, the real nature of disease. We will notice, as far as our space permits, what is said about it and the classifications made of its several kinds; and then we will try to throw a little light on the whole subject.

We shall have very great difficulty in summing up what is said of the nature of disease. The Encyclopædias avoid it. The Dictionaries simply tell us where it is, and what it does. No one ventures on a definition. We know—or think we do—what we understand by it. We cannot get any one to tell us its *nature*. I find in one Encyclopædia an article under the title of hereditary disease, and the usual commonplace things are said. It follows, therefore, that the Sanitarians are working in the dark. They are trying to prevent they know not what. They suppose the new theory of the microbe is right; but, as we have amply shown, the theory is *not proven*. How is it, if this *theory* of disease is right, the *practice* of medicine remains almost where it was? It has not changed in adaptation to the new theory. This point is somewhat puzzling.

Diseases are classified as 'local, constitutional, specific, idiopathic, symptomatic or sympathetic, periodical, acute, chronic, spasmodic, epidemic, intercurrent, contagious or infectious, congenital, hereditary, acquired, sthenic, and asthenic.' An examination of this classification, and of the species that fall under these genera, would reveal some very strange facts, and would be very amusing. We may say, however, that most that is written—and it is a lot—in connection with it all is of very little value. And the reason for our opinion is not far to seek—the *cause* of disease is rarely, if ever, specifically noticed. To put the matter briefly—Sanitation is mainly concerned with preventing the ravages of the microbe. Medicine is mainly concerned with removing the *effects* of disease—in the one case a chimera, in the other an impossibility. The *causa causans* is not in question in either case. The maxim of guidance should be—Remove the cause, and the effect will cease. The maxim, however, is neglected and the result is insufficient.

Can we do anything with this subject? It is difficult, but we may try. *What, then, is disease?* It is a derangement of the system. More than this, however much we may wish to, we cannot say *What is the cause of disease?* It is no mischief-making microbe working either within or without. Of this I am quite certain. I have worked in the removing of disease half a life-time, and know whereof I affirm. I say it deliberately, and I have a record in this matter which few can excel. I have never yet removed a single trouble on the principle that the cause is *without.* I say it emphatically. Disease is not *ab extra* but *ab intra.* Disease is not from without but from within. The main cause of it is *mal-nutrition.* This will come in for treatment in several ways by and by. To make it clear and emphatic, I will repeat it in large letters. MAL-NUTRITION IS THE MAIN CAUSE OF DISEASE. There are accessories, of which the principal ones are,—want of exercise, want of oxygen, injudicious clothing, personal uncleanliness, eating, drinking, and smoking. The *main* cause is MAL-NUTRITION. This operates in two ways—

1. *Too much food is taken.*—It is obvious, on the face of it, that only a certain amount, and this by no means an enormous quantity, is necessary to supply the wants of the body. It follows, therefore, when

too much is taken the work of secreting tests the powers of the secretive organs beyond endurance. If they succeed in overtaking the work they are overdone and worn out by it. If they do *not* succeed, the food is left in the body. It then travels about the body seeking an outlet. It usually travels towards the extremities, though it frequently settles about the abdomen. It is in this way that fevers of various kinds—small-pox, for instance—and abscesses are formed; cancers, too, and issues are produced. The question is a very large one, and would require many pages for an adequate discussion.

It is important to understand *the functions of the stomach.* There is nothing in which we deceive ourselves more egregiously and disastrously than with regard to what the stomach is intended to do. We think and act as if its primary object was to afford us pleasure. We could not possibly be further away from the truth. The first—and indeed in some sort the only—functions of the stomach are to *supply the wants of the body.* It is intended to receive only so much food—not foreign matter at all—as is necessary to meet these wants and to prepare the food for the body's use. We can neither tell the principle on which it makes its selection, nor can we say exactly the quantity it may at any given time require. Experience alone can guide us in these matters. But we do not consult experience, we eat *as much as we can.*

2. *The right kind of food is not taken.* We will take a concrete case by way of illustration. It is a specimen of a state of things of which there are many examples. A child is ill. It is affected in many parts of the system. The throat, as so often

suffers. The doctor comes, sees the *throat only*, and pronounces it a case of 'diphtheria.' There is a fuss, and a consequent expense, which can be better imagined than described. The whole thing is misconceived. The suffering in the throat is only a *manifestation* of the real trouble that has taken hold of the whole digestive apparatus. The child is really suffering from MAL-NUTRITION. How do I know? The symptoms are many and unmistakable. I have watched such a child for many a week, and I have *seen the process going on.* I have spoken to the mother and advised her, though without any effect. Among other things there is now an internal wasting. The fabric comes to pieces and leaves the body. The stomach can make no use of the food, and there is no relish for it. How is this? Take a plant. Let it suffer from want of moisture. It will begin to wither and die. It also, in short, tumbles to pieces from mal-nutrition. But the child in this case has had plenty to eat! And so there have been plenty of stones about the plant, but it could not feed on stones. The child has had plenty to eat. True! But the food was as the stones to the plant. The child has been fed for the most part on white bread. This white bread, *as it is made to-day*, scarcely contains a particle of nutriment. I have dealt with this subject at some length in my book on 'Natural Food.' I do not hesitate to say that white bread more than accounts—is indeed the cause—of most of the diseases that prevail among the poor. They eat white bread, and it does not nourish them. How do I know this? Because I have made it a study in many ways. I have laboured for years in trying to stop the consumption of white bread. I have no sort of doubt on this matter. I am sure that what I say is right. Mal-nutrition is the main cause of disease, and white bread is largely answerable for the mal-nutrition.

We need not discuss the 'accessories.' The effect of these, as compared with mal-nutrition, is very little, and they are already partly covered by what has been said. The point which we must again and again emphasise is this, the main cause of disease is not microbes, but mal-nutrition. This again is a result of two things: (1) Too much food, and (2) the wrong kind of food. And in this, in sadly too many cases, white bread is the greatest offender.

I could give any number of cases in proof of this. I have cured all sorts of diseases by no other means than that of substituting 'Natural' for 'Unnatural' food. Here, then, is the starting-point of all sanitary work: It must begin with the *Person* rather than with the *Public;* it must be *Individual* rather than *General;* it must be done by *Self* rather than by *Proxy.* We need first PERSONAL SANITATION. There is a proverb which says, 'If every one would mind one, all would be minded.' This is perfectly true. The moral is obvious. *Sanitas sanitatum* should therefore be a personal maxim. Many things have to be done in *propria persona*, and this is one. Every man must find the source of his ills *within himself.* Some one says, 'When I put on my hat I cover all my property.' Such a man cannot have many cares. In a truer sense most men may say, 'When I put on my hat I cover all my ills.' They are all *within.* Then, why all our sanitary works?

It will follow from this that we have simplified matters more than we can tell. If the state of the case be as we have said, then DISEASE IS ONE. The cause also is ONE. The cure also, where cure is possible, is ONE. *Disease is one.* How is it, then, that we have so many names? The question is legitimate. Let those say who invent them. There are many manifestations of the one disease. That is true. It occurs to me that a dictionary of the names would be, if properly treated, one of the most amusing books before the public. Some one will say, 'This theory of disease is beautifully simple.' And so it is. Truth is generally very simple.

Why should we spend our thousands in the way that we do? Why impoverish our struggling tradesmen with poor-rates and taxes for useless purposes? In the neighbouring town of Kettering, I am constantly told, the rates are so high that the ratepayers can scarcely keep their heads above water. There is no doubt, with the work of so many councils and their officials kept continually going, that Kettering is only one of a great number. The wonder is that the cry does not go forth from thousands of stentorian throats, 'Stop this useless and outrageous waste!' '*Damnum appellandum est cum mala fama lucrum.*' Why sanitate at such a cost when it means deprivation to so many? This is the question to be considered. No benefit comes to any others than those who gain their living directly from it. Our forefathers lived, and were healthier than we, and they knew nothing about sanitation. If, as is supposed, any good came from it, we might meekly bear it. We have shown by many incontestable arguments, and particularly now by expounding the real nature of disease, that the cause of disease is not a microbe, but unnatural food, and our sanitary works do not touch even the *fringe* of the garment.

CHAPTER XIII

CONTAGION AND INFECTION

'THIS disease is infectious, but not contagious.' And 'this disease is contagious, but not infectious.' And 'this disease is both contagious and infectious.' So now ring the changes on these two words. Of course, if what we have been saying be true, it will follow that these things cannot be. We must, however, not prejudge the case.

The assumption is, that certain diseases are transmissible from person to person. This is effected by some infective material, or contagion, that is given off by the sick person. These diseases are either infectious or contagious. The term contagious is used only of those diseases which are supposed to be transmitted by direct contact of the healthy person with the diseased. The 'germ' theory supposes that a living organism—alias a 'microbe'—occasions the infection. Means of conveying the germs—or microbes—are sputum, epidermics, breath, mucus, excreta, and inoculation. In every case of transmission *time* is necessary for incubation. After this period there is the one of invasion. Then the contagium develops and spends itself. The point is to enable the system to bear it all. The patient remains infectious for a considerable time *after convalescence.* The time depends on the nature of the disease. When there is a case of infectious disease, notice must be given to the authorities. The infectious diseases are small-pox, cholera, diphtheria, membranous croup, erysipelas, scarlet fever, typhus, enteric, continued fever, relapsing fever, and puerperal fever.

Our account of infectious and contagious diseases is a short one, but sufficiently long for us to know how to estimate them. We will now give an account of the *means* adopted in order to counteract them. This cannot be better done than by allowing the authorities to speak for themselves. If there be one quality that should characterise our argument more than another, it is fairness and honesty of purpose. We must be straight and honest. We must, as far as possible, ascribe these qualities to the authorities, and deal fairly with what they say. The following is taken from the New York 'Christian Advocate,' and may be regarded as in every way reliable.

> 'A study of the statistics of communicable disease in our cities indicates only a moderate success for our present methods of notification, isolation, and disinfection. The history of Boston, for instance, is a discouraging one. Boston has more ample hospital facilities for caring for scarlet fever and diphtheria cases than any other large city. Its physicians are not surpassed by any as regards intelligence, education, and public spirit. The proportion of cases reported is very large. Regulations in regard to isolation are stringent and unusually well enforced, yet the number of cases of scarlet fever and diphtheria is not perceptibly less than in other cities. In England, where many more than half the cases of

scarlet fever and diphtheria in the large cities are removed to hospitals, these diseases prevail almost as extensively as in the United States. It is doubtless true that the increasing practice of isolation in these diseases has had its influence in their diminution, but the progress made has not been nearly so great as was hoped.

'Our methods of isolation, so far as they are applied to acknowledged cases, seem to be effectual. Every health officer is forced to admit that it is the unknown sources of infection which cause the trouble. The milder the infection the less likely are the infected persons to be known, and the more difficult it is to control them. The recent outbreak of small-pox was due to the mildness of the affection, very many cases being unrecognised. That many persons who are only slightly ill, or perhaps entirely well, are dangerously infected with diphtheria is well known. Bacteriological studies reveal the fact that from two to three per cent of healthy persons are infected with growing diphtheria bacilli. It is true that the bacilli are not virulent in every case, but even if they are virulent in only a small proportion, we yet have enough to render it likely that these infected well persons are the chief factor in the spread of the disease.

'While we are searching for better methods of dealing with these diseases, there is one line of warfare against them which ought to be pursued more energetically. If unrecognised infection is moving about among us each of us must learn to protect himself. In diphtheria. tuberculosis, and scarlet fever in its early stages, and doubtless in small-pox, the virus is contained in the secretions of the nose and mouth. People should be taught to take care of their own secretions and to avoid contact with the secretions of others. In other words, they should be taught to be clean.

This matter was last winter brought up in the

Massachusetts Association of Boards of Health by Dr. Theobald Smith, and a committee of which he is a member drew up a report urging the teaching of cleanliness among school children and suggesting methods therefore. The means urged were as follows: (1) Lectures to teachers on the relation of cleanliness to health; (2) the distribution of circulars on this subject; (3) object teaching by the school department. The municipality should set an example in cleanliness in the provisions made for the pupils. The drinking-cup used in common by the pupils should be abolished. The greatest care should be taken of the text-books, especially if furnished by the State, and soiled books should never be given out. Pencils, pens, &c., should be absolutely separate for each pupil. If slates are used each child should be required to use for erasing a cloth or sponge kept in its desk. If modelling clay is used each pupil's portion should be kept by itself. In general, it may be said that the school authorities should provide that each pupil shall have its own private school material, and that as little as possible shall be used in common.

In accordance with this plan the Health Board of Providence, R. I., sent a circular to the public school teachers requesting that they teach the children:—

'Not to spit: it is rarely necessary. To spit on a slate, floor, or sidewalk is an abomination.

'Not to put the fingers into the mouth.

'Not to pick the nose.

'Not to wet the finger with saliva in turning the leaves of books.

'Not to put pencils into the mouth or moisten them with the lips.

'Not to put money into the mouth.

'Not to put pins into the mouth.

'Not to swap apple cores, candy, chewing gum, half-eaten food, whitles, or bean blowers, or anything that is habitually put in the mouth.

'Teach the children to wash the hands and face often. If a child is coming down with a communicable disease it is reasonable to believe that there is less chance of infecting persons and things if the hands and face are washed clean, and not daubed with the secretions of the nose and mouth.

'Teach the children to turn the face aside when coughing and sneezing, if they are facing another person.

'Children should be taught that their bodies are their own private possessions, that personal cleanliness is a duty, that the mouth is for eating and speaking and should not be used as a pocket, and the lips should not take the place of fingers.

'CHARLES V. CHAPIN.'

We shall briefly examine the foregoing article, taking the account of infectious and contagious diseases first.

We ask, Is infection or contagion possible? Does sputum convey it? We are told it is largely responsible for the transmission of consumption. But I have known consumptive patients who scarcely ever saw any one spit. I have seen nurses who have removed spittoons by the dozen and have not taken any harm. It would be easy to examine the subject from many points of view, and equally easy to show that it is impossible for consumption to be conveyed in this way. But why is consumption regarded in this light? The sputum comes off the lungs? No, it comes sometimes from the stomach. It would be easy to examine the other assumed causes of infection and to show that they are equally wrong. But we will take a more practical view of matters. We will take instances of the diseases and say what we know about them.

1. *Small-pox.*—I have only the experience of one case—*ex uno disce omnia.* It was a case of a lad nineteen years old. He was employed at Leicester, where there were a good number of cases at the time. He was re-vaccinated. He took ill, and came home. He sickened, became worse, and died. There was a good lady near. People were all frightened, forsook the poor lady, and fled. This lady nursed him through his illness, enshrouded him, and saw to his funeral. She was not re-vaccinated, and she took no harm. She often speaks of this to show that she does not believe the disease is infectious.

2. *Diphtheria.*—I have taken cases of children between my knees, had my hands on their throats, and taken no harm. Their brothers, sisters, and playmates have eaten, played, and slept with them, and taken no harm. The neighbours have gone in and out of the house where the patient was with impunity.

3. *Erysipelas.*—I have seen many individual cases of this disease, but do not remember ever seeing two together.

4. *Scarlet fever.*—I have known cases of one child only in a family taking this disease. And no precautions whatever were observed.

5. *Typhoid.*—I have known many instances of single cases in large families. The father, for instance, has been ill for months, but no one besides.

6. *Nondescript fevers.*—I have known any number of single cases of this kind, but do not remember any instance of two in a family being ill of it together.

I have never seen a case of cholera, and so I cannot speak of it. Croup I have stopped. It is certainly not infectious.

Infection, it seems to me, is in a poor way. How is it that a number of people take the disease *at one and the same time?* Why, for instance, do four people take small-pox in Glasgow? Why do fifty people take it in London? Why does one person take it in Brigstock? These questions answer themselves. There are more than half a million of people in Glasgow, nearly six millions in London, and scarcely a thousand in Brigstock. People take small-pox for the same reason that they take a cold. If small-pox were infectious why do not *more* take it? Such questions may be asked, but they are not easily answered.

We ask here, if the means for stamping out any disease are so adequate and the power to prevent the spread so efficacious as they are accounted to be, why do people take the disease at all?

It is clear that, if we take a *sack* to the pump to fetch away water, we shall not bring much home. It is as clear that, however near we may go to the *causa causans* of disease, we shall carry none away if we have no receptacle in which to carry it. 'Healthy blood,' quoting again Sir William Collins, 'is fatal to the microbe.' Healthy persons *cannot* take disease.

We need not pursue the argument in this direction any further. We may feel convinced that there is really no such thing as infection or contagion. These ideas are just as real, or just as imaginary, as those that account for diseases by the agencies of the witch, the wizard, and the demon.

We will now discuss the article as it deals with the way to *fight contagion.* We notice that it is taken from a respectable paper which quotes from the

Medical News, and it is written by a responsible person. We may regard it as authoritative.

The writer first acknowledges that the methods of notification, isolation, and disinfection are practically a *failure*. This in a city of America, in which, of all others, there ought to have been complete success. We may be sure that all science, art, and money could do has been done. And yet the writer can chronicle no satisfactory results, and is obliged to confess that the history of the work 'is a discouraging one.' This, taken in conjunction with what Dr. Leal and Sir William Collins have said, is very significant. It speaks volumes. It clinches my arguments completely. I could not wish for more convincing evidence that my views are right. *Veritas prevalibit.* Truth must triumph. Let me ask the reader to con carefully, and again and again, the first two paragraphs of this article. Notice that nothing could possibly be more corroborative of my contention—RESULTS are practically NIL.

The writer, in his second paragraph, pens this pregnant sentence, 'Every health officer is forced to admit that it is the *unknown* sources of infection which cause the trouble.' The unknown? Yes, but not unknowable. The reason for not knowing is, as I have pointed out, because they seek it where it cannot be found. They seek it *outside* and it is *inside*. The last thing about which they think is the real source of all the trouble.

It will easily be seen, as we read and study the writer's remarks, that the idea of infection still possesses the mind of the authorities. He finds the sources of diphtheria, tuberculosis, scarlet fever, and small-pox in the secretions of the nose and the mouth. 'Drowning men will catch at straws.' One would say that when men have recourse to the utterance of such ideas as these, they are sadly put to it. We will not follow our friend further. I confess I do not know how to deal with such puerilities. The writer first acknowledges that the results of sanitary work, when directed against big ideas, has failed. He now lays hold of puerile ones, and suggests that operations be directed against *them*. He notices what has been done in this respect and commends it. We suppose it is on the principle if the bigger things will not suffice the lesser might.

It seems to me that we need not disturb ourselves so much as we have done about infection and contagion. We may leave these ideas severely alone as they do not hurt us. The things have no existence in fact. Our aims are, or should be, positive, and not negative. It is not a question of obeying such commandments as, Thou shalt not harm thyself, Thou shalt not go where harm is, as *Thou shalt do thyself good*. Let a man practise virtue and he will not require to shun vice. Seek health. Do not trouble about disease. Our Sanitarians have got hold of the wrong end of the stick. They seek to prevent an imaginary foe from attacking man. They should try to persuade him to take care of himself. This is their proper sphere and there is verily enough work to do in it. It is time they saw that their work has been 'weighed in the balances, and found wanting.'

CHAPTER XIV

DISINFECTION

WE have said so much on the Antiseptic Treatment, that we ought not to require a separate chapter for 'Disinfection.' The two are so much alike, and so nearly allied, that the discussion of the one is almost the discussion of the other. But something more has to be said on this point.

We will take a concrete case by way of illustration. The one we select is a case of diphtheria. There are two children seriously ill. The illness is pronounced infectious. One nurse is sent for, then another. There are five more cases of illness in the village. A tent is erected for the purpose of isolation, but it does not answer. A hospital is extemporised. The children are isolated. There is no prospect of any further cases, but that is no matter. There is nothing like precaution, and we must exercise as much of it as is practicable. The illness is *ab extra*, and the cause is somewhere. It is in the *schools*, although no schools could possibly be healthier or better. They must be colour-washed, &c. It is in the *drains*, and they must be flushed. It is in the *water* and *milk* and they must be boiled. The children must not go to school, and the Day and Sunday Schools must be closed. All, who can, must leave the place. The drains, houses, schools, &c., are drenched with disinfectants. The houses in which the cases obtained must be vacated, all the furniture must be turned out and cleaned. The walls must have the paper taken off them and be white-washed. People are worried out of their lives. This is what the use of disinfectants means. One would suppose that this was the very way to make people ill. And yet we are told it is all *necessary*.

The place is everywhere made to *stink* with disinfectants. This is what is understood by disinfecting. Now let us see what disinfectants are. It is difficult to distinguish between a disinfectant and an antiseptic. The one is said to destroy, the other to arrest the development of 'germs.' They are thus both intended to annihilate the microbes, unless, indeed, we can distinguish between to 'arrest' and to 'destroy.' Heat is said to be the best disinfectant. Some authorities say, that neither heat nor cold affect the 'germs.' There are all sorts of disinfecting machines, and steam seems to be the favourite agent. We are told it is invaluable for the disinfection of morbid discharges, such as cholera stools and the like. Carbolic acid and chloride of mercury are also considered good. The former, if it is to be more effectual than the latter, should be concentrated, and used very liberally. Condy's fluid, and such like things, are not considered so good. 'They are *mere antiseptics*.' Sulphurous acid gas is considered best for disinfecting rooms. Chlorine gas is thought even more efficacious.

What shall we say to all this? We have given a concrete case and we have noted the agents. If we examined the matter thoroughly, we should have to repeat ourselves. We might, however, here remind ourselves of the testimony of Drs. Leal and Collins, who have practically, though not intentionally, condemned the use of disinfectants altogether. Sir William Collins has intimated that there is a better way—'Get healthy blood. Microbes cannot touch it.' With this proviso we are safe-guarded. To this point all our efforts should be directed. It is a maxim in politics, 'If you would have peace, be prepared for war.' It should be a maxim, one would think, with all who would be well, and provide for general well-being, to set the principles of health in operation. If we are well, we are not ill. This is common sense. Keep well, therefore. What must we do to accomplish this? First and foremost, leave Sanitation alone. Its business is disease; ours is health. We do not want, or need, to consider any question but this—How to be well.

With respect to the concrete case which I have described. I may say that it was a case of 'much cry but little wool.' I did not see, and I was an eye-witness of the whole proceeding, that the sanitation schemes served any purpose but that of *exploitation*. There was almost no sickness. The sanitation did no good whatever, but it did a great deal of mischief.

Our forefathers knew nothing about these things. They are of mushroom growth, and, let us hope, they will be of no longer duration than a mushroom. Born in a fog, let us hope a little more light will exterminate them. '*Fiat Lux.*'

CHAPTER XV

DRAINS—SMELLS

THIS is a large subject. We need not consider it in all its bearings. The question of drainage, as applied to *land*, is not now before us; and we need not consider it as applied to towns and villages in all its aspects. As a means of carrying away waste water, there is very little to be said. It is a matter of necessity that this be done. There is no question of health or disease involved here. The subject is narrowed down to one view of it,—*The avoiding of putrid matter giving off smells.* Putrid matter produces microbes; the smells carry the microbes into the air. In this way disease is supposed to be spread. Our subject then is more especially *smells.*

We will notice first the *old* methods. We had first of all *open drains.* By this I mean gutters without any covering. This kind of thing obtains very largely even nowadays. We have it still in some of our villages either in whole or in part. It is a subject of great complaint with Sanitarians. The complaints, however, are groundless. It obtains very largely still in some Continental towns, and serves its purpose very well. At Cologne the drains seemed to me to be mostly *open* drains. At Freiburg, im Breisgau, there is no doubt about it. At Dunkerque too. Here the drain-water is allowed to run freely into the docks, almost anyhow and anywhere. The smell from it, when the tide is out, is very bad indeed; but I have never known any harm to come from it.

We ask here, *Do the smells indeed carry microbes?* How do we know? We put pipes over the drains in order to conduct the smells into the air; but do they carry microbes into the air? How then can things be any better? But *which* smells carry microbes? Does eau-de-Cologne? Does Frangipanni? The questions shock the ladies. They say, 'Of course not?' But how do we know? If one smell carry microbes, why not another? Why not each? Who is to determine? Of course, no *agreeable* smell does any harm! Doesn't it? The smell of *toddy* makes the old gentleman's eyes fill with tears and his mouth with water; it is so nice. And yet if he indulge too freely he will be drunk. The reason then is not a good one; there is no logic in it. We cannot differentiate smells, or say which are injurious and which are not.

We may know, if not from science, yet from experience, that smells are not necessarily injurious. There is a fell-monger's yard at the foot of our garden. Skins are brought there by the score nearly every day. There is always, day and night, more or less of putrefaction about them. So much does this obtain, that an agent of one of the proprietors once tried to stop the business. The matter became so serious that I had to step in to defend the fell-monger. His workmen spend half their time in these smells, and take no harm. I confess I do not enjoy it, but, although I have spent a good deal of time in the garden, I have never taken any harm from the smells. Surely, if the smells were impregnated with microbes, the shining sun would reveal them, and it does not.

It would be easy, I suppose, to give instances of towns, such as St. Helens, and parts of towns, such as Bow in London, where the smells are prevalent and almost continuous. I have not had much personal experience of these things, but I have met people who have lived in them. These people assure me there is no sickness traceable to the smells. What now of the microbes in smells?

Then what must we say of those men who have to work in the drains of our large cities such as Paris and London? It is a matter of fact that hundreds, if not thousands, of men do this daily. But it is *not* a matter of fact that *these* men are more prone to take disease in consequence of their exposure. Indeed, experience, if it has anything to say in the matter, points in the *other* direction. How is this? I know the usual answer that is made, 'Oh, but they are used to it.' The answer is illogical. Can men become used to taking poison? 'Yes,' some one will triumphantly answer. 'Look at the smoker! Look at the tippler!' But in either case on the first occasion of smoking or tippling there was nausea, sickness, disaster, but perseverance gradually dispersed these things. True. The smoker could indulge almost *ad lib*, and the drinker could freely indulge his potations. This is plausible, but there is an easy answer. The sentinel that gave the warning note is silenced. That is all. The mischief indicated is silently going on, and will show itself in full force in time. Who can gainsay this? This kind of thing does not obtain with smells. The men engaged in drain-work, other things being equal, live as long as others do.

One illustration more, and only one, though many are at command. Some years ago I was staying at Cairo. When the new part of the town was built it was drained on modern principles. But as rain rarely falls there was no means of flushing the drains. They were obliged, therefore, to go back to the old system of running the sewage into cisterns. This is still done in many Continental towns. It answers very well, and is much more economical than our present system. The sewerage is used to manure the land. When the cistern is full a cart comes at night with the necessary apparatus and it is emptied. It means smell, of course, but nothing in this way is *lost.* In England on our present methods nothing is *saved.* While we were at Cairo, after a period of five rainless months, rain fell incessantly for about two days. The streets were in consequence more than ankle-deep in water. The water filled the cisterns and the smells were awful. If ever smells *could* create disease then 'all the diseases of Egypt' would have burst forth. It is impossible to give any notion of the smells, they were so disagreeable. If any one could think of a smell coming from a hundred different points and striking him at one and the same time he would have some sort of notion of what it was. It was simply awful. And yet, so far as I know, nobody was any the worse. Smells, then, do not convey disease.

We need not adduce further evidence of this kind, though, if necessary, it would easily be forthcoming.

The old system, so far, was as good, if not better, than the new.

Our next point will be to show that the new methods defeat the object for which they were intended. The intention was to promote health by restraining, or carrying away, the smells, and the present system, far from doing anything of the kind, simply *make matters worse*. Let us see this.

In our villages, and to some extent in the towns, the open drains have largely given place to covered ones. These covered drains were made with stones so placed as to leave interstices between them. Through these interstices the foul gas escaped and was absorbed in the soil. On this system no smell could possibly get into the atmosphere. This plan worked very well indeed. Within the last few years the *socket pipe* has been invented. This allows *no escape of gas*. And now for an illustration of its effects. A few years ago this system of drainage was adopted at Stanion. The drains are of socket pipes, and neither water nor gas can escape. Everything goes to the *mouth* of the pipe, and as I need hardly say, there is now an issue of foul water and smells. Before there was neither the one nor the other. In Brigstock there was an open drain in existence as long as man can remember, from a row of houses to the brook. It answered the purpose very well. It carried away the waste water, and there was neither smell nor pollution. The filth found its level before it reached the brook. But now what is the fact? The brook is polluted for a considerable distance. and there is always a smell! I do not see how, under these circumstances, it can be otherwise.

I can only speak of what I know. I know what has taken place in our two villages. And I do not hesitate to say that modern so-called improvements, instead of obviating the inconveniences—rather supposed than real—actually tend to bring them about.

It may be desirable on other grounds to lessen rather than intensify the odour from the drainage. That, however, is another question, and one to be debated only on the ground of comfort. On this ground I should perhaps have nothing to say. My object now is simply to make it clear that on the ground of sanitation the whole thing is useless. This is the point which I am anxious to emphasise: *Smells do not contain disease germs of any sort, and can effect nothing evil.* They are unpleasant—that is all.

I have just been in the garden watching the man at work with his digging. Quite near to him are a lot of beds which he has only just covered with manure. About him there are a number of trees and plants growing. What follows? There are smells from the manure, there is fragrance from the soil, and there are gases from the trees. Do all these carry disease germs? Which? 'This is nonsense?' Yes, so it is. But these things are all on the same level.

There is one point more, and I have done. If smell could harm or hurt how would the animals live. Look at the pig! He is in filth almost from the day he sees the light till the butcher takes him. Then, again, our farmyards are no better than they ought to be, and yet, as everybody knows, the animals live year in and year out in their smells and they take no harm. To seek disease-germs in smells, therefore, is to chase a will-o'-the-wisp. There are no such germs to be found.

On the face of it, as putrefaction does not contain disease microbes, it is clear that smells, which come principally thence, could not contain them either. Why, then, go into the question at all? The answer is this, 'Somehow or other the disease germ has to be found in the smells.'

Here is a little incident given in one of the 'dailies' which effectively illustrates our point:

'STARLINGS AND SEWER GAS.

'That what is deadly in the case of one species is harmless to, and even enjoyed by, another is, of course, common knowledge, and the fact is being illustrated almost daily in all sorts of odd ways. A few days ago a contemporary published a statement from a correspondent at Liverpool showing that a pair of starlings during the past season built their nest and reared their young in an atmosphere which in all probability would have proved deadly to human beings. A ventilating shaft from a main sewer had been passed some 30 feet up the trunk of a large elm tree. The wire guard at the top had been broken, and this was soon discovered by the birds, who promptly built their nest on the site thus thrown open, and reared a fine, healthy family, 'despite the fact that sewer gas must have been passing through the nest all the time.'

The writer of the above does not see the logic of his argument. It is the old proverb in another form, 'What is food for one is poison for another.' The proverb is foolish. Food cannot be poison. One man's stomach can bear more than another, that is all. And so if smells could destroy life they would destroy *all* life. They do not destroy *bird* life, and so they destroy *no* life. This is logic.

Avoid smells if you will, they are unpleasant ; but never suppose that Nature intended them to harm you. She will do us nothing but good. Let the smell admonish of putrefaction, then of death, then of life, and lastly of how to preserve life. Our business is to know—*How to live.*

CHAPTER XVI

AIR

THE Sanitarian has much to say about *pure air*. And, as a first requisite of life, too much cannot be said of it. At all costs we should seek to breathe it. The Sanitarian's object, however, is to keep out deleterious matter—principally smells—and this is the wrong way about. It is not so much a question what is *in* the air as what is *out of it*. The question should be,—Does the air contain sufficient oxygen? This is the point. My notion is that all else sinks into utter insignificance in comparison with this. I have for a long time been impressed with this idea. My object has been twofold. (1) To get the lungs so to work that they would take in sufficient air to supply the wants of the system, and (2) To provide this sufficient supply.

I think we cannot do better here than reproduce, in part at least, my chapter on the subject from 'How to be Well.' We shall repeat ourselves somewhat, but that will be no serious disadvantage. It is a question of driving home the lesson we would teach.

'FRESH AIR'

'Where so many things are necessary it is difficult to make a choice of the one with which to begin. Many things are necessary to health, and we begin with fresh air. Why? Is it the most important? We may not say this. Many principles underlie art—all art, any art. We could name these principles one by one, and talk about them; but we could not say which was the all-important one. A good illustration is a wheel. It has many spokes, and each bears its part of the work, and adds to the stability of the wheel; but we could not say which was most essential, or which started to turn first. And so it is here. We may not say which, of all the many things essential and necessary to health, is most important. We begin, therefore, with fresh air, simply because we must take some one thing first.

'We shall lay down as a self-evident axiom that what God has ordained is best. We cannot add to it or take from it. If we do we spoil it. God has Himself prepared the air of the atmosphere. He has done this for us and for all living creatures. It is best as it comes out of His hands. We do well, then, to breathe it, as near as we can, as He has prepared it.

Now air is a mixture principally of two gases—oxygen and nitrogen. These gases are mixed in proportion of one of the former to four of the latter. The oxygen is called the vital element, because it supports life. Yet, if we breathed it only, we should live too fast. Nitrogen, on the contrary, as is generally supposed, is a poisonous gas. If we breathed it in its simple state, therefore, we should soon die. It is only as it is judiciously mixed—and it is so in nature—that it suffices to support life.

'But what is a poisonous gas? I am not prepared to answer this question. I do not know. The fear is that there is more than a little nonsense talked about this matter. Let us see; for it is more than probable that many, if not most, so-called poisonous gases are like nitrogen—they are only poisonous when breathed alone. They are injurious because they disturb the proper admixture.

'If we ascend a mountain from ten to fifteen thousand feet high we experience certain unpleasantnesses and inconveniences. The head begins to ache, and the sensations about the eyes, ears, and nostrils are exceedingly disagreeable. The sensations are intensified the higher we go. It not infrequently happens, indeed, that blood will begin to ooze out of these apertures.

'Now, why is this? Ask the scientist, and he will very properly answer, It is because of the rarity of the air. Press him, ply him a little further, then what? The same answer. But what we want to know is why the rarity of the air causes all these things. And it is only after further thought that he will say the want of oxygen is the cause. The vital element is not inspired in sufficient quantity. This is significant.

'Where does the remedy lie? We must obviously change our method of breathing. The normal method does not suffice. The greater the rarity of the air the faster we must breathe. If ordinary breathing does not suffice, we must make our breathing extraordinary. Where we breathed once we must now breathe twice or more, as the case may be. Take in as much as suffices by rapid breathing, and the rarity of the air cannot harm us.

'Come, now, down from the mountain, and go into a closely packed room. There are five thousand people in it, and there should not be more than half the number. They have been there some time, and so the oxygen has been largely replaced by carbon. Take your seat. Wait awhile. What follows? You experience, not exactly the same, perhaps, but very similar disagreeable sensations. You will have a headache, from which you will not easily recover.

What is your remedy? The best would be to get out of it as quickly as you can; but, failing that, it will be the same as before Breathe more quickly. This will be robbing your neighbours. True, but the choice lies between doing this or continuing to suffer.

'As on the mountain, so in the closely packed room, it is the want of oxygen that renders the air unfit to breathe. It is not the presence, or otherwise, of poisonous gases in the air. In nature the gases are mixed in due proportion. This is a fact we cannot gainsay. If experience did not warrant it we should have to admit it so soon as we knew it was the great Creator's work. 'He doeth all things well.' My point, however, is that it is very difficult, if not impossible, to say which gases are *per se* poisonous. For it seems clear enough that we should take but little harm if we breathed always sufficient oxygen.

'This is a very interesting point. It is further illustrated by the curious grotto that may be seen at Royat. This grotto is scarcely below the surface of the ground, and is high enough to allow of the largest person to stand upright, with two or three feet to spare in places. It always contains a great quantity of carbonic acid gas. The gas varies at different times in height. The day I saw it there would be about two feet of gas. The man who showed us over performed several little experiments, illustrating the presence and effects of the gas. He blew out some soap-bubble bladders, which, after a few gyrations, rested on the gas. A dog would not enter the grotto because the gas was not high enough to admit of his breathing. A candle would burn but dimly if partly immersed in the gas. It did not go out until it could get no oxygen at all. This is very curious, and points in the direction noticed above. Carbon is a poisonous gas, but only when, like nitrogen, it is breathed alone. Our guide filled a can with gas, and poured it through the spout on a lighted candle. The effect, I think, was as instantaneous as if it had been water. I have often wondered what would be the effect, supposing it possible, if a man could breathe in equal proportions oxygen with one nostril and carbon with the other. Carbon alone would be death, so would also the want of breath. The divers in the pearl fishery can remain under water eighty seconds; and we have read of divers remaining, without breathing, more than three minutes; but these things are not usual. This is quite clear—oxygen must be breathed in sufficient quantity. How far it may be mixed with other gases is not clear.

'A more important point to insist on is the necessity of breathing the pure air of heaven. We can never, as it so far appears, determine how much of this gas or of that we can mix with impunity with atmospheric air; but it is safe to say it is far better to keep the air as pure as may be. The Maker knew His business, and we may rest satisfied with this. We often think, perhaps unconsciously, that we can improve upon His work; but in this we are wrong. "He looked upon all the things which He had created and made, and found them very good." We should be able to deduce much from this consoling statement.

'But now, what about the air of Egypt? Many people go there because of the good air. Egypt is a great puzzle, has been so, and will remain so. Its pyramids are not by any means the only element of difficulty; the air is so too. "All the diseases of Egypt"—a proverb in Old Testament times, and to-day it is applicable. Why? Who shall say?

'Cairo is a well-built town. There are few towns anywhere that possess more attractions. It is said to be well drained; but, because the drains produced fevers and caused other epidemics, the system is not used. All refuse is, therefore, now run into cisterns, which are periodically, as occasion requires, emptied. It is more than probable that the authorities had right on their side. There is but little rain there, and so the drains could not be flushed. But now, what obtains?

'I was there in the spring of last year, and it rained heavily for two days. The drains were not there to carry off the water, and so it lay, in some places almost knee-deep, in the streets. There was nothing for it but to pump it into water-carts, and carry it away. But the smells! It would be difficult to describe them. If we could imagine a distinct smell—rather stink—coming from a hundred different directions, and concentrating on one point, it would be possible perhaps to conceive the experience which was our lot. Unpleasant was not the word; unbearable would be more like, only that there was no option. What was the upshot? Nobody, so far as I know, was any the worse. But why? One of two things must have it: either we were able to resist the disease, if the smells could bring any, or the smells were so far innocuous. Now I cannot say, for I do not know, if these smells were frequent, but I could not help asking the question, Why send invalids to Egypt? Why, indeed, if smells, *per se*, cause disease?

'But a greater puzzle still is to account for "all the diseases of Egypt." The air of the desert is certainly invigorating. As I sat on the top of the Great Pyramid, and looked as far as the eye could reach over the great trackless waste that lay all round—no, not all round, for on one side, in the far-off distance, lay Cairo with its towering minarets—I felt the sweetness, as I never felt it before—no, not even in mid-ocean—of the air that moved around me. I would have given anything to have been left alone, but that was not possible. We were a party of three. Each of us had three attendants in the shape of dirty Bedouins. These men swarmed, imploring and intreating backsheesh, about us, and the odour—well, it was not pleasant. Their presence certainly rendered impossible any enjoyment of the breezes. Perhaps we longed for the pleasure all the more because the sultriness of the base was absent on the summit. But the odour of the persons of these men set me thinking. Was this one of the causes, perhaps the great cause, of the diseases? I suppose the problem is not open to solution. Since the British occupation sanitation has received great attention in all sorts of ways and directions; but I do not hear that the results are perceptible. I gave some attention, and made inquiries, but I could not find that the right cause of "all the diseases of Egypt" was ascertained. It is clear good air does not prevent these diseases. It is also clear that smells do not of themselves induce diseases.

A letter which I received from a member of the American Mission at Cairo will serve to corroborate what I have said, so I give it, as follows:—

'"BOOK DEPARTMENT OF THE AMERICAN MISSION IN EGYPT.

'"CAIRO, EGYPT, *May* 6, 1895.

'"DEAR BROTHER,

'"Your kind letter and book came to hand this morning. Thanks for them.

'"I can scarcely speak on the diseases of Egypt. They are, as they were in the time of Moses, many (Deut. xxviii. 60). Within the past month two young Englishmen of my acquaintance have died of small-pox. Leprosy is also a disease of Egypt that has lost none of its loathsomeness. Just this morning I saw a young man at our door, one of whose hands has entirely dropped off to the wrist, and portions of the other hand are gone. His feet are also gradually dying. There is a town, not many miles from Cairo, of which I am told that most of the inhabitants are smitten with this horrible disease.

'"You know that ophthalmia in many forms is prevalent. Malarial fevers prevail after the inundation, when pools of water stand all over the country.

'"Diphtheria carries off many children, and altogether it is said that of the children born not more than one in four arrives at the age of ten years. I cannot vouch for this proportion, but it is certain that infant mortality is astonishing.

'"We have been trembling for years past, expecting a visit of Asiatic cholera. It usually comes once in each decade. It has not been here, however, since 1883. It has already broken out at Meccah and Jeddah, as you have no doubt noticed.

'"With fraternal regards,
'"Yours truly,
'"JOHN GIFFEN.

'"REV. J. P. SANDLANDS,
'"BRIGSTOCK, THRAPSTON, ENG.'

'I ought, perhaps, to explain that Mr. Giffen's letter was in great part written in answer to my question to him about the prevalence of disease. There is no room to doubt, as it seems to me, that disease is as rife to-day in Egypt as ever. Pure air does not ward it off. Smells, apparently, do not promote it, otherwise the Europeans would suffer more. Yet—and on this point we must be emphatic—pure air does promote health; it is one of the first conditions of it. And, on the other hand, we must freely admit that smells, adding, as they do, nothing to our pleasure, do not enhance our well-being.

'The gentle reader will perhaps be asking—and not unreasonably either—"Well, and what is the object of all this?" I have principally two objects with much that I have been saying—viz.: (1) To say a word or two on disinfectants; and (2) to suggest that much we do in the way of sanitation is so much waste of strength.

'What is a disinfectant? I do not suppose for a moment that my definition will be generally acceptable. I give it, notwithstanding, as—a stink to destroy a stink. I can see a smile, and perhaps a contemptuous turn of the nose, as my friend comes across these expressions. If, however, he will do me the pleasure of asking how he came to think that there was any virtue in a disinfectant, he will not do anything of the kind. He will find on examination that he never said, Is there really any good in these things? but has accepted the theory—I say not *fact* —that there is, on another man's *ipse dixit.*

But now let us ask, What can a disinfectant do? It can change the smell. Is that any good? You had a smell a little while ago; you have another now. What is the difference? You have never thought of it in that light. Of course you have not; but that is exactly what you should do. But may be the new smell is stimulating? Some smells are stimulating; it is said that the smell of the fellmonger's yard is so. I believe the same may be said of a tannery. And there may be some truth in these opinions. But who is going to determine these things—say whether the smell caused by the disinfectant is more stimulating than the one which it has replaced? Then it is to destroy such smells as those of the fellmonger's yard that disinfectants are used.

Oh, but disinfectants kill the germs! Do they? What germs? We have seen that we do not know what life is, and so are in no position to say positively what disease is. We do not know that there is a germ. But let it be so; there is a germ. The disinfectant, for the sake of argument, destroys it. Now let us see where we are. The germ is going to attack life. On what condition will it be successful? On this, that it be stronger than life. If it be weaker—of course, as the battle is to the stronger—it can affect nothing. Then what life? All life. Then no one is safe. But a germ is a seed. Where does it come from? Who is sowing it? Oh, it flies about in the air! Then there will be a race, and may be the disinfectant will be the winner. But is it the stronger? Of course, or otherwise it could not kill. The germ is after life to kill it; the disinfectant is after the germ to destroy it. The disinfectant wins, and accomplishes its purpose; the germ is dead. What now? The disinfectant will attack life and destroy it too. And what is to hinder? If the disinfectant can kill the germ, and the germ is stronger than life, why should it not kill the life too? If there be such a thing as logic, it is clear that much that is said and written about disinfectants is nonsense.

'As to our second point—sanitation—much of the above will apply also to it. The object of it is to avert smells. This is done mainly in two ways: (1) By carrying the smells away up into the air; and (2) by conveying the smells, by means of air-tight pipes, to convenient outlets. My contention is in all this that the old-fashioned way of draining is better than the new. It did not, and does not, aim at carrying away the smells at all. There is no better deodoriser than the earth, Nature's own provision; and as things were—drains made with stones—the smells entered the earth and were lost. The smells were not allowed to enter the air at all.

'I hope I have succeeded, as I have wished, to make it evident that there is much yet to learn, and perhaps something also to unlearn, in all that we think about the air. But the point I want to make is this: that our object always should be to breathe the pure air of heaven. This means a great deal. We should be in the open as much as possible. We may almost lay it down as an axiom, we cannot be too much out of doors. And if there be one place more than another where the air seems best, it is in the vicinity of newly-turned-up earth. Fresh earth is not only the best deodoriser, absorbing all smells, but it gives out a fragrance that is invigorating.

'It will follow also that we shall admit as much fresh air into the rooms in which we spend our time indoors as possible. Our open fireplaces and sash windows will help us much in all this. We in

England stand in strong contrast in these particulars to our Continental brethren. No open fireplaces and windows closed constitute the great staple with them of comfort. The consequence is too often that in winter it is almost impossible to breathe the air of their stuffy rooms. I often wondered, as I have wandered amongst the villages in the heights of Switzerland, at the wan looks and sickly features of the people, especially of the children. We go there to recruit and become strong in mind and body. We succeed. Yet they remain anything but pictures of health. How is this? The explanation is not far to seek; we breathe fresh air, and they don't. Like too many, they think the best thing to do is to keep out Heaven's great blessing, fresh air, and they do it effectively. Every nook and crevice is stopped up, almost hermetically sealed, and the air is breathed over and over again.

'And if it be necessary to have fresh air in our living-rooms, it is equally so to look to this in our bedrooms. The air cannot be too fresh for us at night. We cannot, and we may be sure of this, breathe Heaven's admixture too pure when we are asleep. Frequently, when abroad, I have been admonished on this point, but I have invariably left the admonition unheeded. The Indian mothers of North-West America train their children from their earliest infancy to sleep with their mouths closed. The consequence is, they can sleep in the open air with no other covering than the canopy of heaven, and take no harm. And this in the coldest nights in winter. There is a German, so report has it, who is pursuing a system of healing, and one of the main features in it is breathing in the open air. After this, we shall not hesitate to sleep with the windows of our bedrooms open, and the more so the better. The maxim on this point will be, get all the fresh air possible night and day, especially the latter, and shut your mouth when sleeping.'

The foregoing shows two things: (1) That the air is best as Heaven has made it. (2) Sanitation cannot alter anything. We do not require to say anything further about (1). This goes, or should go, without the saying. There is but little that we can say about (2) more than we have already said. Sanitation, as is quite clear, seeks to remove the smells, and these, by all sorts of arguments, are shown to be, so far at least, perfectly harmless.

CHAPTER XVII

WATER

WE find in dictionaries and encyclopædias—especially in the latter—elaborate disquisitions on *water*. As it is something with which most of us are fairly well acquainted, we shall only so far deal with it as it is a subject for the Sanitarian. He depends for his guidance, in a great measure, upon the *dicta* of the doctor. But in the matter of water he must further be guided by the analyst, who must tell him whether any, and how much, of what the doctor condemns he can find in the water. We cannot do better, therefore, than see exactly what the analyst says. The following comes timely to our aid. It is part of a report prepared by William Elborne, M.A., F.C.S., F.L.S., public analyst for the city and borough of Peterborough. We only give so much of it as is necessary to our purposes. I hope to deal fairly with it. No good can ever come of acting otherwise.

'WATER AND WATER-ANALYSIS FOR DRINKING AND DOMESTIC PURPOSES.

'A good drinking water should be colourless, clear, and bright in appearance, free from odour, and palatable to the taste. Disregarding the dissolved gases of the atmosphere, all natural waters, except "rain," contain in solution, primarily, varying amounts of inorganic (mineral) saline substances, associated more or less, according to the nature of the collecting areas and geological strata yielding them, with organic matter, that is, with matter of vegetable or animal origin. From a sanitary point of view, a pure water, suitable for drinking and domestic purposes, is one in which the dissolved inorganic saline constituents are of a harmless character, not excessive in amount, and not associated with more than traces of organic matter. As regards these saline constituents, chemists find by experience that natural waters are likely to contain in solution some combination, often some half-dozen or more, of the following compounds, the difference between waters being caused by the different proportions of such constituents.

Chiefly	Carbonate Sulphate Chloride	of Calcium (Lime), Magnesia, Soda,
With traces of	*Nitrate* *Nitrite* *Phosphate* *Silicate.*	*Potash*, *Ammonia*, *Iron*.

‘The total amount of saline constituents in a water intended for drinking and domestic purposes should not greatly exceed 70 grains per gallon; the best waters of course contain considerably less than this amount, whereas those greatly exceeding it and those containing saline constituents other than those above enumerated, are generally designated "mineral waters." Although often very palatable, and indeed quite suitable for drinking purposes, nevertheless, for general use waters excessively charged with mineral matter are likely to be extremely "hard," and in this respect quite unsuitable for washing and other domestic purposes, besides tending on evaporation to unduly clog kettles and steam boilers with a troublesome stony incrustation, or "fur."'

As an example of a 'complete chemical analysis' of a potable water, the following is a recent analysis by myself of an artesian spring, or deep 'bore' in this vicinity, the bright, clear water rising above the surface of the ground in a copious flow from below a thick bed of clay (140 feet); the analysis being expressed in grains (and decimal parts) per gallon. It is a perfectly wholesome water.

Carbonate of Lime	8·10
,, Magnesia...	4·50
,, Soda	10·60
Chloride of Soda	17·40
Sulphate of Lime	6·10
Nitrate of Soda	0·18
Silica	0·50
Carbonate of Iron	0·10
	47·48

Total solids	47·52
Chlorine	10·50
Nitrogen in nitrates	0·03
Free Ammonia	0·02
Albumenoid Ammonia	0·004

Hardness, 13 degrees.
Hardness after boiling, 6 degrees.

'In *water analysis for sanitary purposes*, provided the mineral constituents are not excessive in amount, nor abnormal in kind, it suffices for the analyst not to pursue the analysis in detail of the mineral constituents, but to devote his whole attention to ascertaining the extent (if any) of what are known to be impurities prejudicial to health.

'And what are these impurities? It is now incontestably established that a number of epidemic diseases, especially typhoid fever and cholera, are contracted and spread by means of drinking water which has been in contact with the organic excreta of persons suffering from these diseases; hence, when a water contains organic impurity, in solution or in invisible suspension (in the form of exceedingly minute microscopic living germs), it becomes of great importance to ascertain whether such be of animal or vegetable origin. If found to be the former, and exceeding a certain limit, such water is considered unfit for drinking purposes.

'While, therefore, the presence of sewage and excrementitious animal matter in water can be readily discovered by chemical analysis, to distinguish whether such matter is specifically infected or non-infected with disease germs is beyond its province, and the only safe course is consequently to abandon for domestic purposes the use of any water found upon analysis to be polluted with such sewage or animal matter. No convenient process is known whereby natural waters specifically infected with zymotic disease germs (extremely microscopic organised "living" matter) can be effectually purified.

The first thing to notice in connection with this report is, that the analyst allows that mineral matter may be taken in water with impunity; the second is, that no organic matter may be so taken; and the third thing is, that ammonia and chlorine may not be so taken unless they are mineral products. There are many interesting questions other than these that we might discuss. I have dealt with some of them in my book on 'Natural Food.' Others are not to the present point.

The analyst's position is contrary to experience. Minerals do not enter into our constitution at all. What would guests say if, when they sat down to dinner, they were offered pieces of iron and brass to eat? But what is the difference? Some one will say minerals solid and minerals in solution are not one and the same thing. What are they, then? Will any one say? Are not minerals always minerals? But minerals are found in the body, and they must enter some way? *Where*, then, are minerals found? We need do no more than deal with one subject. Salt, it is said, is found in the blood. And it is a mineral. Let us examine this. Salt is found in animals and man. We are told that cow's milk contains seven per cent. of salt. Human milk contains four per cent. The cow eats no salt, man eats a lot. And yet the cow's milk contains more per cent. than human milk. How is this? The truth of the matter is that cow's milk contains no mineral *salt* at all, but *salt* which is a vegetable product. One thing is clear—vegetables live on the earth. Another thing is clear. Animals live on vegetables. Minerals have no function to perform in the human body. They ought never to enter it. When a man eats salt, Nature at once cries out for water to wash it away. She can make no use of it. It is clear, then, that the analyst is wrong. And the truth is that we need, if we drink water, to do so as free as possible from all mineral products. Some systems are strong enough to throw off useless matter. Others are not.

And just as the analyst's first position is wrong, so his second and third are wrong.

Why not take organic matter? The ducks and the geese live on it. Horses and cows often take it. We also often take it, and are none the worse for it. I have put the following challenge more than once before the public: 'If you take a glass of water from a quantity run through stable manure, it would not be so harmful as a glass taken from an iron spring.'

No one has accepted the challenge. I had a series of articles in one of our county papers weekly for six months. Two doctors tried to answer me; but they did not try a second time. I used every manner of means to provoke a discussion; but it was all in vain. No one would write. I do not make my statements at random. My thoughts have been concerned with them for years. They are so strange, and so contrary withal to the accepted notions, that I should not make them if I were not sure of my ground. It is not putrid matter that so much spoils water as mineral products.

Ammonia and chlorine are distinguished by the analyst as productions of putrefaction and minerals. In the former case they are injurious, in the latter they are not. I will not say the exact opposite of this is true. I do not know. What I know is, that workmen have worked, and do work, in the midst of the fumes of ammonia, and have taken no harm. The grocer was telling me this afternoon that such a workman used to deal at his shop, and the money which he took out of his pocket was often quite black from the ammonia. Far from being hurt by it, he said he seemed all the better. He was a man employed in the tannery, and his work consisted in cutting away the putrid matter from the skins.

I will not pursue the argument further, though much I would. It is not necessary. We have noticed the points with which the Sanitarian is concerned in dealing with water. This is quite sufficient for our purpose.

[1] We might examine the question from another point of view. Should we drink water at all? My readers will smile. The question, however, is debatable. The sheep, under normal circumstances, does not drink at all. No animal, so far as I know, drinks with his food. Man need not drink. The question, however, lies outside our province. Just now we are discussing the Sanitarian's work. Our object is served. We have shown that his aim is misdirected, for the mineral constituents he lets alone, and the putrid matter he seeks to take away. The latter is so far harmless, while the former is pernicious. Both might, if possible, be extricated, but the mineral products certainly should be.

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[1] A lady supposed to be suffering from ulcers, ill more or less for three years, has just left (October 26th) quite recovered. It occurred to me that a part of her treatment must be no liquids, though she had lived some weeks on nothing but milk. She drank nothing at all for fourteen days, and did not need it. She was quite well when she left.

CHAPTER XVIII

THE MAIN CAUSES OF DISEASE

WE have found that the further we pursued our argument, the more cumulative it became, until it was simply overwhelming. The poor little microbe has all the life crushed out of it, and its friends, where are they? They are out in the cold, cheerless world, without any comfort. Their little bantling is dead. What can they do? Where can they go? There are no comforters but such as Job had, and they are sorry ones. We must not, however, be merry. It is not seemly. Our business is serious. Our friends are honest and mean right. It is not their fault that they have travelled on the wrong road in pursuit of a phantom. It is of the essence of the age. They did not go 'where fancy led,' so much as whither circumstances drove. If a microbe the age would have, a microbe they must pursue. And if a microbe they could not overtake, it is not they so much as the age that is to blame. They have not, 'more's the pity' for their sakes, overtaken it. We have (metaphorically, of course) killed it. We believe the microbe is dead; and we invite all—friends and foes alike—to come to the funeral. If I were a poet, I would compose a pæan specially for the funeral service.

When the English classic, as the story goes, would leave his luggage at Lucerne, not knowing the language of the natives, he fell back on his own classical lingo, and said, '*Requiescat in pace, Resurgam.*' This, Anglicised, would mean, 'Let it lie quietly; I shall turn up again.' And we may say of the microbe, 'Peace to his remains.' But we would add, '*Non resurgam*'; for we hope that the disturbing little creature will *never* rise again.

The following short but pregnant leader is deserving of attention:—

'THE TRIUMPHS OF EXPERIMENT.

'The Hon. Stephen Coleridge's "Open Letter to the Registrar-General," which appears in *The Contemporary Review*, is a telling example of the vein ironic. Under the form of a serious expostulation with the Registrar-General for printing mendacious statistics in his annual report, Mr. Coleridge contrasts the record of deaths from certain diseases, which have been the subject of much experimentation on living animals, with the high claims put forward of beneficent results of such experimentation in an article in the new edition of the "Encyclopædia Britannica," written by Mr. Stephen Paget and Dr. Noel Paton. The former of these gentlemen is well-known as a strong advocate of vivisection, and Dr. Noel Paton, we are told, "is so little concerned with either side of the controversy, and so detached from the tiresome provisions of the law, that he entirely forgot to procure a licence when, in 1895, he himself experimentally starved kittens for fifty-six and a half hours." Mr. Stephen Coleridge shows that the very diseases which are said to have been brought under control by recent experimentation are those from which the proportion of deaths has risen. Anthrax is one of the diseases in regard to which much is claimed for experiments upon animals. But from anthrax in the human subject a larger number of people died in 1899 than in any previous year. In regard to diphtheria the antitoxin treatment—another product of experimentation—was begun in 1894, and besides its curative use the antitoxin has been used as a preventive to stop outbreaks of the disease. The Registrar-General's figures show that ever since that date the deaths per million have maintained a much higher average than before. The serum treatment has also been prescribed for tetanus, and the deaths have risen from 26 in 1896 to 66 in 1900. As regards "Myxœdema," the "Encyclopædia" article claims that—as the result of experiments—"now, with little bottles of tabloids, men and women are restored to health who had become degenerate in body and mind, disfigured and debased." The Registrar shows a remarkable rise in deaths due to this class of diseases: they went up from 137 in 1888 to 322 in 1900, being an increase of from 5 to 10 per million. Inoculations with Wright's serum for typhoid were imposed upon our soldiers who went to Africa, and the War Office returns show a high mortality from this disease, while at home the death-rate from typhoid has risen from 245 per million in 1897 to 290 in 1900. Other instances are given, which go to show that either the Registrar-General's statistics are "among the most colossal frauds of this or any age," or else that the claims put forward on behalf of vivisection and the antitoxin and inoculatory treatment are—well, just what Mr. Coleridge assumes the Registrar's sixty-third annual report to be. As it stands the article is certainly a damning indictment of the unreliable and partisan character of one of the contributions to the new edition of the "Encyclopædia Britannica"—a work which ought to present fair and unprejudiced statements on the subjects of which it treats. The moral is that it is not safe to trust to the freedom from bias of professional experts in dealing with their own pursuits.'

Nothing could be better than this. It shows that some, perhaps many, are not only ready to attend the obsequies of the microbe, but of its lovers too. 'Drown the clerks' used to be a familiar cry; but it only meant 'make a bigger noise.' So here. 'Bury the professional experts' need only mean 'Put their work out of sight.' This kind of thing comes thicker and faster every day, and from all quarters. I do but focus the feeling, and give it a right direction. It cannot miss the object at which it aims. Death to the microbe. Death! He is practically dead already. Here are more coming to the funeral! Read the following from the *St. James's Gazette*:—

'INCREASED CIVILISATION: DECREASED BIRTH-RATE.

'The birth-rate slowly but surely diminishes in proportion to the advance of the community along the path of civilisation (says the *Medical Press*). During the twenty years ending 1895 the birth-rate in Germany fell from 42 to 36, and in England from 36 to 29. In France the fall is less perceptible, amounting only to ·8 per cent. (26 to 25·2). Young people are no longer content to wed under conditions which satisfied their predecessors. Possible bridegrooms, no doubt, take into consideration the question of providing for their offspring, and it cannot be denied that the cost of educating children up to the present standard, low as it is, imposes on the parents burdens previously unknown. Another circumstance which cannot but have a powerful effect on the inclination to marry is the gradual emancipation of woman. Hitherto marriage has in a great measure been the only "occupation" for which women were trained, and for which they were in any sense fit. The very fact that women now enter openly into competition with men in walks of life previously restricted to the latter tends to reduce the number of possible husbands by reducing the sum total of salaries earned by them. A smaller birth-rate may introduce new and altered conditions into our social system, not necessarily of a kind detrimental to a high standard of general well-being, and when the surplus population is reduced to a great extent the nation will be less disposed to sacrifice lives in destructive wars.'

The writer is on the right track, but he bifurcates a little. Civilisation is the cause—the unfortunate cause, let us add—of the deterioration of the age. True! And yet not exactly as the writer puts it. It is not altered views respecting marriage, or the changed position of woman, that are so much at fault. Civilisation asks for, and will have, *luxurious living*. This—and not the microbe either, as Dr. Keith puts it in his 'Plea for a Simpler Life'—is where civilisation is at fault. To change the metaphor, we must put the shoe on the right foot. Civilisation asks for much that is right. Civilisation also asks for much that is wrong. We rejoice to know that people are coming to see that civilisation is very far out in some of its ways; but we must see to it that we know where, and why.

We must know not only where the Sanitarians are wrong, but also in what way they would be right. It is particularly to answer this question that I write this present chapter. I shall number the points, and mark them distinctly, so that there can be no mistake about them. They are, from their nature, more personal than public.

(1) *Want of Oxygen.* We need not discuss this point at all. We have seen already that to breathe sufficient oxygen is one of the great requisites of life.

(2) *Want of Exercise.* Exercise, especially of the lungs, is absolutely necessary to health. The question, however, is a long one. I have discussed it elsewhere.

(3) *Improper Food.* By proper food we ought to understand 'Natural Food.' Elliot Stock publishes a book under this title, which fully sets forth what the expression covers.

(4) *Condensed Food.* This is condensed folly. It serves no good purpose, unless it be that of filling the makers' pockets.

(5) *Adulteration.* I have already had a good deal to say on this point. There is scarcely an article of consumption to-day that is not more or less sophisticated. It was only the other week that a Scotchman, who has travelled and seen a good deal of the world, was telling me that at Minnesota there was a large business done in preparing and exporting flour. This flour was made of any and every species of refuse wheat. It is ground into the finest flour, all the colouring matter carefully extracted, and then mixed with some deleterious whitening matter. In this way it is sent to England, wholly unfit for food. It is perfectly true also that everywhere in America flour, made of maize, and separated from all its nutritive particles, is sent over in enormous quantities to England. We must ourselves not be led away in the exploration of facts in this fruitful field. They are too many.

(6) *Quack Medicines.* If there be one subject that

makes me angry more than another it is this. A few years ago, perhaps a dozen, we had a number of cases of deaths from a certain disease. I found that in every case the sufferers had been spending their last penny in the purchase of a quack medicine. I thought, 'Is it for this that we have been assisting these poor people?' The vendor of this quack medicine advertised a case of cure every week—especially in the religious papers. I followed the cases for several weeks, and, as I expected, there was not a single genuine one. One or two were already dead, and in one case, the rector told me, death was accelerated by the medicine. I wrote at once to the religious papers asking them to stop this nefarious business, but there was not one of them that would do it. I refused all religious papers at once, and for a time took none. I said, 'How can religion be expected to prosper that is supported by such means?' I dare not allow myself to expatiate on this subject, lest I should say what I ought not, and seem to be uncharitable. I will content myself, therefore, with simply pointing out this one thing, and recalling the fact, that I have already shown we do not *cure* disease at all by *medicine*. Dr. Keith says, and he had a long experience as a medical practitioner, '*The doses of the homœopath are less likely to do mischief than those of the allopath, because they are smaller.*' This means, if it means anything, that doses, both allopathic and homœopathic, were not likely to do any good at all.

(7) *Personal Uncleanness.* This does not affect us much in these days. There is a strong disposition the other way, of which we must have a care. 'A rub down is as good as a feed.' This is so far true

as well of the horse as ourselves. We should take care, however, that it be a rub down only. A cold sponge merely, and a rub with a rough towel is better than the bath. We should not take the fat from the pores with soap, as some of us do.

(8) *Drinking.* The less we drink of anything the better. Wines, beers, spirits, tea, coffee, and cocoa are not foods. Milk should be sipped with a teaspoon. Water may be full of earthy matter. If we ate fruit we should not need to drink. We should not drink with food at all.

(9) *Smoking.* We know that Nature never intended man to smoke at all. He would otherwise have provided him with a chimney. Polly, the mare, would not smoke the best cigar we could find for her. A little smoking might, perhaps, do very little harm. It can, however, do no good.

(10) *Overcrowding.* Here is a moral evil as well as a physical one. Such things as do obtain ought not to be. I will not say much about it, though much I would, for it is a prolific subject. I will only point out that the nearer we can approach to 'open air' the better, and the further we go from it the worse.

(11) *Sickness.* What to do when a person is ill it is very desirable to know. I have not said much on our other points. I want to make an exception here. I cannot do better than reproduce a letter I wrote on the subject to one of our local papers. It indicates both what should be done, and also what should not be done. The letter refers specially to small-pox. The principles, however, have a general application. In brief, we may say, the best thing to do in illness, is nothing. Go to bed. Stop there. Neither eat,

nor drink. One thing is enough for Nature at a time. And she has that one thing in the disease. A few grapes, or an orange occasionally, but certainly nothing more should be taken. The following is the letter :—

'SIR,

'Molière said many years ago, if people were flattered, it was not the fault of the flatterers, but of those who wished it. I do not think we may accept the moral teaching of the remark, but we may acknowledge that there is a great deal of truth in it. Now I have seen a remark this week more than once to this effect. The small-pox is being exploited. The remark is not mine. I did not originate it, and I do not adopt it. I hope, indeed, it is not true. I want to call attention, however, to a few points in connection with the subject, especially as it falls in with our object, and may not be inopportune in view of what is about to take place at K——.

'(1) *The Nature of the Disease.*—What is small-pox? A correspondent, hailing from London, has twitted me and scolded me this week very severely, and I might use a stronger term to describe the things he has said to me. And this because I said the disease was called a skin disease. Now some one has also sent me a medical work wherein the disease is classed under the head "Exanthemata." I do not know why the word is used, as an English word would do very much better. It simply means skin diseases. The expression, therefore, is not mine. But, and this is our point, small-pox is not a skin disease. The eruption on the skin is nothing more or less than the disease making its way out. This eruption, as I need not say, should be encouraged until the whole of the disease had been thrown out by the system. Small-pox is in no other sense a skin disease. Another writer has sent me a leaflet, wherein he speaks of the disease as having its seat in the nervous system. This writer is as far out as the other. Small-pox affects the nervous system 'tis true, but there is scarcely an organ in the system it does not affect. The nature of small-pox is pretty much the nature of every other fever.

'(2) *The Cause of the Disease.*—There have been articles in the papers and letters, too, wherein it has been argued that the cause is dirt. "The disease is a filth disease." I was astonished to see a leading article in one of our "dailies" this week in which the writer argued very learnedly for this view of the case. We ask, dirt? Dirt where? In the person? In the surroundings? Well, but the cleanest in their persons and surroundings take it! How now? My experience is not large, but all I have known personally were most exemplary in this respect, and were vaccinated withal. Then it is said, "It is the atmosphere." But there is nothing now abnormal in the atmosphere, and there has never been. Besides, in such a case many would take it. Two or three thousand only in six millions have taken it. How can it be the atmosphere. Then again, "It is infectious." How can this be? How did the first person take it? Why do the attendants not take it? The cause is not in any or all of those things. The cause of small-pox is just the cause of all diseases.

'(3) *Prevention of the Disease.* — Small-pox, I submit may be prevented as every disease is prevented, by living naturally. If any one will take the trouble to think the matter out, he will see that a principle in nature is everywhere and always a principle at work. Water flows downhill, and it is no use to construct drains to run it uphill. This principle is clear. And every other principle in nature is as true. Now, we do not find any such principle at work in nature as "curing disease by disease." The notion has no basis whatsoever in fact. Inoculation may prevent it; but the workings of Nature do not warrant us thinking so. Besides why not inoculate for influenza? The one act would be just as sensible as the other.

'(4) *The Treatment of the Disease.*—This is a large question; but I shall submit, notwithstanding the fact that the notice will be ridiculed, that small-pox should be treated, like every other disease, calmly and quietly at home. The fuss and talk we make about it is calculated to do more harm than anything we gain. Who that knows anything of the working of a very powerful principle in nature—the principle that induces a fellow working in the surroundings—does not know and feel this? To make this matter short, I challenge the justification of the opposite view.

'(5) *The Cure of the Disease.*—This is the same as the prevention. I have, however, already made my letter rather long. I am quite prepared to justify my position. What I want is some one to challenge it. Will any one do it? I have been hammering away this eight or nine weeks at this subject and no one dares to come forward and disprove my points!

'Now, what does it all mean? Simply this, that we are not only worrying ourselves by our conduct into all sorts of illnesses, but we are wasting the ratepayers' money in useless expenditure. Why do I write these things? Can it be supposed that I do it for popularity? But the thoughts are not popular. To profit by it? In what way can I profit? It remains, therefore, as it would seem, that I can have no other reason than the promotion of our best welfare. "*Magna est veritatis vis, et prevalebit.*"

'Yours, etc.,

'J. P. SANDLANDS.'

(12) *Thought.* For years I have made a point of this—*The Influence of Thought on Health.* The Germans are making much of it. I do not know if in this they, like the American doctor, are copying me. It is, perhaps, only an incident. They are

writing about it—the more the better. I will only say now, *High Ideals*, *Virtuous Thought*, *Noble Aims*, all promote health. The opposite tends to destroy it.

There are many other little things that have an influence on health. Common sense, perhaps, more than anything else, will be our guide in discriminating. This is, however, a commodity, notwithstanding it be much or little possessed, that is rarely brought into requisition. 'Stop and think!' 'Consider your ways!' We cannot have or exercise better maxims than this. Thoughtlessness is the parent of many evils.

But, if what we have now been saying be in any way suggested by common sense, it follows that the question of health is more a *personal* than a public one. Every man, woman and child—if we may say so of the last—is personally responsible. He cannot relegate these matters to another. Nobody—public or otherwise—has any right to usurp. We have by far too much *grandmotherly* legislation. We are *governed* till we hardly know how to walk. At the pace we are going in a few more years we shall scarcely be able to leave our front doors without knocking our heads against some regulations or other. This disposition to multiply rulers is producing the opposite effect. There is now a universal disposition to resent *all* rule and authority. Working men, and maids too, all want to be themselves masters.

The twelve points we have noticed cover, more or less, the main things that concern our health. Again and again we have to say they are *personal* matters. It is impossible, in the nature of things, that another should do them for us. The things with which the Sanitarians are concerned are 'pure air" and 'water.

Their object is to remove putrefaction and its effects We have seen that in these things there is nothing to fear. Their work, therefore, so far, is perfectly worthless. The results on health are *nil.* We do not blame them. Their work is as good as it can be. The fault is not theirs. It is in the nature of things. *Natura rerum stabit.* We cannot alter them.

And now, what? Shall we hark back! That is not the way of the world. 'Forward! is our watchword.' By all means, let us go forward; but let it be out of the fog into the light of day. There is plenty of work to do in relieving the world of the ills that oppress it. How many! how great! those ills! What can we do? Our work lies not so much in relieving men of the burdens they ought to bear as in showing them their responsibility, and in teaching them how to bear them. This is the work. How is it to be accomplished? I confess I do not know. My aim, however, is not in this direction. It has been all along, and must be so still, to show that if the microbe be the cause of all our ills, what we are doing, somehow or other manages to miss him. The ills do not decrease. Far from this, they go daily from less to more. As sensible men, we shall stop and think. Our work need not stop—must not stop indeed—it must go on. 'There remaineth much land to be possessed.' There is work to do. And we must overtake it. Personal work, and personal aim. We talk of the three R's in education. Let us talk of the four P's in things Personal—*Prudence*, *Perseverance*, *Patience*, *Perfection.* 'Lead, kindly Light.' '*Fiat Lux.*' And from the death and burial of the poor persecuted microbe, let us anticipate the birth of three C's—*Courage*, *Cheer*, *Content.* *Ainsi soit il!*

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